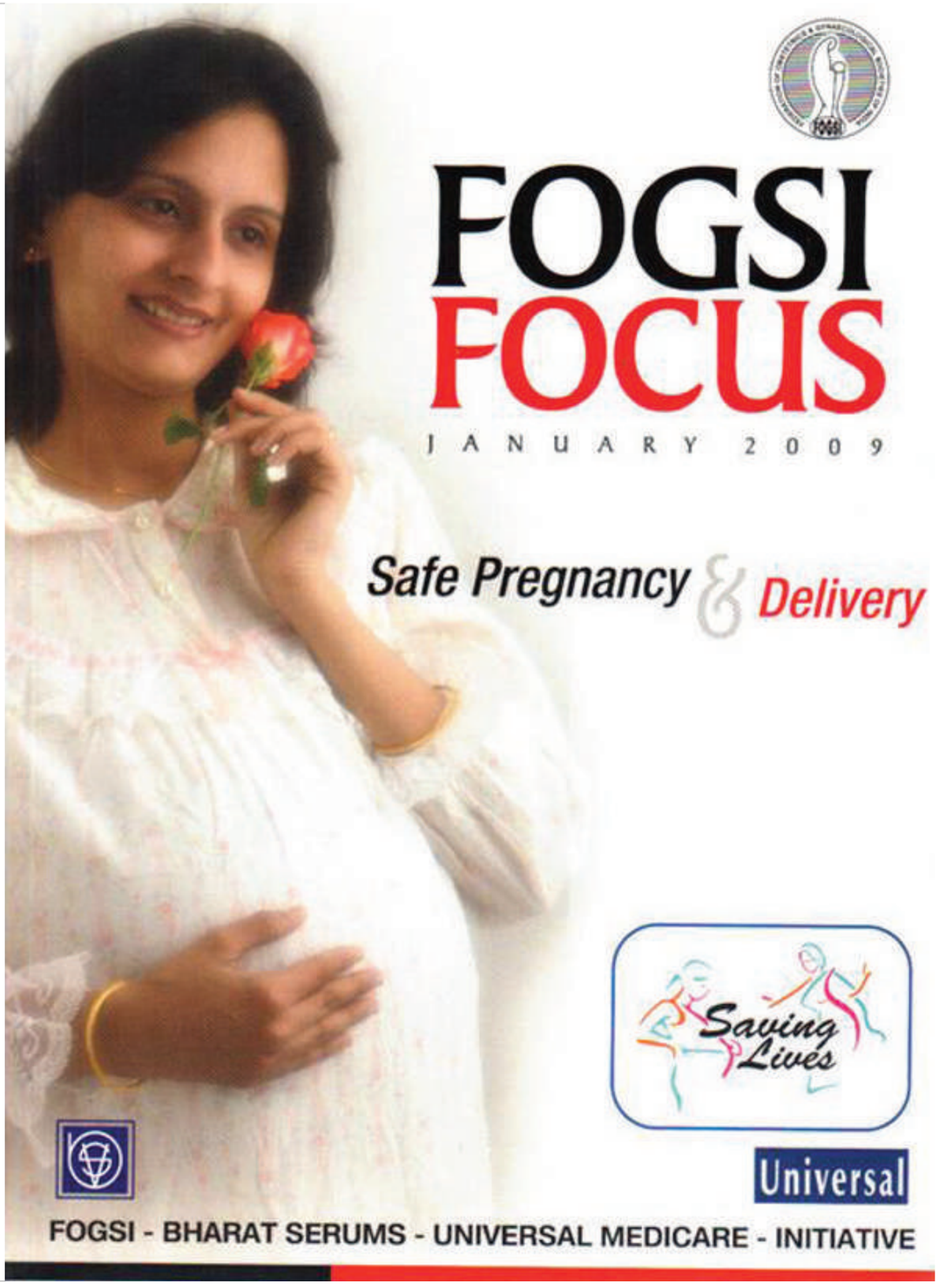

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Editor's Message

Dr. H P Pattanaik
Vice President
FOGSI -2009

Dr. Madhuri Patel
Joint Secretary
FOGSI 2009

Very Warm Greetings!

This "FOGSI FOCUS" on "Safe Pregnancy & Delivery" has contributions from eminent Gynecologists & Obstetricians. They have taken lot of efforts to put the information in a precise manner. The articles are arranged in a sequences of Antenatal , Intrapartum and Postpartum period. We are sure that these will make an interesting reading .

We are greatful to all the contributing authors who have put in their valuable time to write the best readable material.

The articles are carefully selected and we hope that this will update the knowledge of Obstetricians to reduce Maternal and Perinatal Mortality and Morbidity in future.

M. A. Patel

Dr. H P Pattanaik
Vice President
FOGSI -2009

Dr. Madhuri Patel
Joint Secretary
FOGSI 2009

Presedent's Message
Safe Pregnancy & Delivery

Dr. C. N. Purandare
President FOGSI 2009

Dear FOGSIANS,

I am pleased to present to you this " FOGSI Focus "on "Safe Pregnancy & Delivery". My theme for the year is **"SAVING LIVES"**.

The last year's logo showed a girl with seven Ribbons, depicting seven problems. I am going to pick up few of those ribbons and concentrate on them. I only want to work hard to save lives. I want all of you to take a vow to make the difference.

We in India are crossroads with high maternal mortality which is astronomically high at 307 per 100,000 live births. 300 women die everyday due to pregnancy and childbirth complications and more than 90% of maternal deaths are preventable. Forty percent of pregnant women have complications and 15% need obstetric interventions for complications which are potentially life threatening to mother and baby.

I have seen mothers die for want of blood, for want of transport to shift them to tertiary centers. I have run to the rescue to deal with PPH to harness the great arteries to control hemorrhage. During the riots in Mumbai I had to go to J.J. Hospital through curfew and firing by unfurling a white handkerchief as a flag and do a caesarian section to save a life. We have all seen the anguish in the eyes of patient's relatives and also tears of joy when you tell them that the patient is safe.

In collaboration with Bharat Serum and Universal Medicare, we are launching the 'FOGSI – BHARAT SERUM - UNIVERSAL MEDICARE Initiative' for Safe Pregnancy and Delivery.

Thisi nitiativew illh ighlighto nt hea spectso fS afeP regnancya ndD eliveryt o strengthen the knowledge of Obstetricians by conducting over 60 CME'S all over India in Our Societies. This will highlight the nutrition in pregnancy; need for medications and delivery management especially the use of misoprostol.

I hope our endeavor will bear fruit by achieving our ultimate goal of reduction in Maternal Mortality and saving our Mothers.

Thank you,

C N Purandare

Dr. C. N. Purandare
President – FOGSI 2009

C O N T E N T S

FOGSI FOCUS

January 2009

Safe Pregnancy & Delivery

ANTENATAL CARE IN FIRST TRIMESTER

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INTRODUCTION

Antenatal care today is an integral part of health care delivery system in pregnant women. A lot of emphasis being given to antenatal health so that disease processes affecting the mother & child can be diagnosed early enough to reduce the morbidity and mortality associated with it. With the changing lifestyle scenario of the working class, particularly in urban area and one/two children in a family becoming the norm, each pregnancy becomes a precious pregnancy[1]. Antenatal care should address both the psychological and the medical needs of the women within the context of the health care delivery system and the culture in which she lives. It is proved that antenatal care can significantly reduce maternal and perinatal morbidity & mortality[1].

Primary objective of antenatal care is to ensure a normal pregnancy with delivery of a healthy baby from a healthy mother.

Others aims are:

1) To screen the 'high risk" cases
2) To prevent or to detect and treat at the earliest any complications.
3) To continue medical surveillance and prophylaxis
4) To educate the mother about the physiology ofp regnancya ndl abourb yd emonstration, charts so that fear is removed & psychology is improved.
5) T o impress the patient about the importance of regular check ups

Advantages of first trimester visits:

1. Confirmation of normal pregnancy and/or diagnosis of abnormal pregnancy like ectopic, vesicular mole or missed abortion.
2. Early detection & treatment of preexisting/ newly developed medical or pregnancy related problems
3. Dating of pregnancy, particularly in women not knowing exact last menstrual period. This helps in future to in diagnosis & management of IUGR, postdated pregnancy etc.

CONTENTS OF ANTENATAL VISITS

A) **Assessment:-** A well taken history (medical, obstetrical, surgical) along with thorough general and obstetric examination is the foundation stone of effective antenatal care supported by relevant laboratory & other investigations.

B) **Health promotion:-** Antenatal care is an opportunity to promote the maternal health

messagesr egardingn utrition,r est,h ygiene, sex, blood transfusion, newborn care etc.

C) Care provision includes

1) Nutrition:- The pregnancy diet ideally should be light ,nutritious, easily digestible and rich in proteins ,minerals and vitamins and should be of women's choice. Dietary advice should be given with due consideration to the socioeconomic status, food habits and taste of the individuals. Only essential supplementation that is recommended during early pregnancy is that of folic acid. The Center for Disease Control and Prevention (CDC) recommended that all pregnant women should take folic acid supplement 500mg/day during first trimester[2].

2) Weight gain:- In first trimester, the weight gain is only 1-2 kg. But importance of gaining weight in second & third trimester should be emphasized right in first visit.

3) Laboratory tests:- Recommended investigations includes complete haemogram, blood group with Rh factor, blood sugar, urine routine examination, VDRL & HIV[3] In areas with facilities, hepatitis B surface antigen, pap smear and ultrasonography with or without biochemical markers of trisomy can be done.

4) First trimester ultrasonography:- Ultrasonographic screening has been an integral part of antanatal care[4]. Transvaginal sonography in first trimester helps to detect early pregnancy, accurate dating, number of fetuses,g rossf etala nomaly,a nyu terineo r adnexal pathology. In case of multifetal gestation, first trimester sonography helps to detect chorionicity. High resolution scanning during the first trimester is now possible and not only chromosomal abnormalities but also structural anomalies can be diagnosed by this means[5].

5) Rest and sleep:- Woman may continue her usual activities throughout pregnancy but hard and strenuous work should be avoided in first trimester .On an average patient should be in bed for about 10 hours (8 hours at night and 2 hours at noon)

6) Exercise:- In absence of medical and obstetric complications, 30 minutes of moderate exercise a day is recommended. Activities with high risk of falling or abdominal trauma should be avoided[2].

7) Occupational work:-Exposure to toxic chemicals and radiation in work environment is best avoided during first trimester

8) Preconceptional counseling:- It is important particularly, in cases of Rh negative mothers, HIV positive mother, cases with past or family history of genetic diseases. Nuchal translucency measurement with maternal hCG & PAPP-A done at 10-14 weeks is effective first trimester screening test for trisomies & other anomalies.

9) In patients with recurrent abortion there is special importance of first trimester antenatal care. Investigation[6] to detect cause, treatment and psychological support is important. Also supplementation of natural micronised progesterone and hcg in case of luteal phase defect. In patient with antiphospholipid antibody syndrome low dose aspirin and heparin can be started in first trimester to improve pregnancy outcome.

10) Coitus:- According to study conducted it was found that coitus should be avoided in first trimester .

11) Travel:- Travel by vehicle having jerks are better to be avoided. Rail route is preferable to bus route and travel in pressurized aircraft offers less risk.

12) Drugs:- Almost all the drugs given during pregnancy will cross the placenta and affect the fetus. Keeping this in mind, the following guidelines are formulated:-

* If the benefit outweighs the potential risks, only then can the particular drug be used with prior counseling.
* Only well tested and reputed drugs are to be prescribed and that too using the minimum therapeutic dosage for the shortest possible duration.

13) Nausea & Vomiting: Mostly physiological. If it affects day to day activity, it requires treatment inform of anti-emetics. Rarely hyperemesis may require admission & intravenous treatment.

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NUTRITION DURING PREGNANCY

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Pregnancy is a physiological state of increased nutrional requirement. Adequate nutrition is on of the most integral part of antenatal care. Inadequate intake of nutrients may lead to maternal and fetal complications and thus increase perinatal morbidity and mortality.

Calorie requirement:

Total calorie requirement is increased during pregnancy more so in second half of pregnancy. Pregnant women should be given extra 300 kcal/day (minimum 1800 kcal/day). Women with multiple pregnancies need extra 300 kcal/day for each extra fetus. Young adolescent pregnant women need extra 500 kcal/day

Protein requirement:

Protein is required for the growth of fetus, placenta, uterus & increased blood volume. Requirement during periconception period is 0.8 g/kg/day. It increases during second half of pregnancy to 1.1 g/kg/day (RDA- 71g/day).

Carbohydrates:

Carbohydrates should constitute 50-55% of total calories (a minimum of 175 g/day). In patients with gestational diabetes and pregestational diabetes, it should be reduced to 40-45% of total calories.

Fat:

Fat constitutes 20-30% of total calories. Saturated fat should constitute <10% of total fat requirement. Polyunsaturated fatty acids should be at least 10% of total fat and rest should be monounsaturated fatty acids.

Iron:

Total Iron (Fe) content of normal adult woman body is 2-2.5 g. Total requirement during pregnancyi s1000mg(fetus& p lacenta-300mg, excretion (git) -200mg, increased RBC mass-500mg).

RDA of iron during pregnancy is 27mg of ferrous iron/day.

WHO recommends universal iron supplementation for all pregnant women. Places where the prevalence of anaemia is less than 40%, 60mg elemental iron and 250µg folic acid is recommended for 6 months in pregnancy. If the prevalence of anemia is more than 40%, additional 3 months supplementation is to be given in postpartum period.

Govt of India recommends 100mg elemental iron and 500µg folic acid in second half of pregnancy at least for 100 days.

Indications of increasing daily iron intake

- Multiple pregnancy
- Irregular iron intake
- Iron deficiency anaemia

Commonly used iron preparations

Brand	Iron salt	Iron(mg)	Elemental iron	Folic acid(µg)	30 tab (Cost in Rs.)
Autrin	Fe fumerate	300	98.6	1500	42
Livogen	Fe fumerate	150	50	1500	42
Fefol	FeSO4	150	50	500	150
Orofer XT	Ferrous ascorbate		100	1100	
Globac XT	Ferrous bis glycinate		60	500	240
Dexorange	Ferric amm citrate	100		500	54
Fefol Z	Carbonyl Fe		50	500	160

Folic acid:

Folic acid is required for neural tube formation in the fetus. Neural tube is formed in the fetus before 8th week of gestation. Neural tube defects (NTDs) are second most common (1-2/1000) major congenital malformations after cardiac defects. Recommended daily allowance during pregnancy is 400µg/day. It should be started before conception and should be continued till 12 weeks. In women with previous baby with NTD recommended dose is 4mg/day which should be started at least one month before pregnancy. Wald (2004) estimated that folic acid (5mg/day) reduces the risk of NTDs by 85%. Preconceptional folic acid in women with previous baby with NTD decreases the incidence of NTD by 70%.

Folic acid requirement is increased during pregnancy for red cell growth and division. Prophylactic therapy is given to prevent megaloblastic anaemia in a dose of 500 µg/day.Therapeutic dose to treat megaloblastic anemia is 1mg/day.

Calcium:

Recommended daily allowance

- Adult women : 400 mg/d
- Pregnant women (19-50yr) : 1000 mg/d
- Pregnant women (14-18yr) :1300mg/d
- Lactating women : 1000 mg/d
- Twin pregnancy : 1500-2000 mg/d

A multicentric Cochrane review has revealed that calcium supplementation during pregnancy may reduce the risk of hypertensive disorders of pregnancy. In 2006, Villar J et al have shown that calcium supplementation (1.5 g/d) does not reduce the incidence of preeclampsia but does reduce the severity, maternal morbidity & neonatal mortality.

Commonly used calcium preparations

Brand	Salt	Elemental Ca	Other components
Shelcal	Calcium carbonate	500mg	250IU
Megacal	Calcium citrate	210mg	Vit D3, Zn,Mg
TripleACal	Calcium hydroxide	150mg	
B-cal	Calcium citrate(1000mg)		Vit D3, Zn, Mg

Docosahexaenoic acid (DHA):
It is an omega-3-fatty acid and makes 40% of fatty acids in fetal brain and retina. It is estimated that the fetal requirement for DHA is 10 g. The foetus has limited ability to make LCPUFAs (long chain polyunsaturated fatty acids) so it is dependent on placental supply for both LCPUFAs and essential fatty acids. A poor supply will affect neonatal growth. Placental supply comes from the mother's dietary intake or fat stores. It is not available from vegetarian diet. Fish oil is the excellent source.

Benefits during pregnancy

- Decreases the risk of premature delivery and fetal growth restriction[5]
- Better visual development in premature infants
- Decreases the chance of development of type 1 DM in offspring[6]

Fetal brain development starts early & experiences “growth spurt” during last trimester and first 6 months of life. So requirement is increased during third trimester.

Studies have shown that women with PIH have lower levels of omega-3 fatty acids. But compelling evidence for a beneficial effect of omega-3 fatty acids on preeclampsia from recent prospective, double-blind studies is still lacking
MAXEPA is a market preparation (prepared from fish lipid oil) which contains eicosapentaenoic acid (180mg) and docosahexaenoic acid (120mg)

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ULTRASONOGRAPHY IN 1st TRIMESTER

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The goals of a sonographic examination should be clinically relevant and appropriate to the development stage[1]. Early in the first trimester, the major clinical concerns of a referring physician are site of the implantation, the embryo-fetus alive and likelihood of subsequent demise of a live embryo-fetus. Other important goals of first trimester diagnosis include assessment of gestational age, determination of the number of embryo and assessment of chorionicity and amnionicity of multiembryonic pregnancy, detection of embryonic-fetal anomalies and assessment of uterine or adnexal masses.

NORMAL SONOGRAPHIC APPEARANCE

Fig 1: Transvaginal Sonogram showing a gestational sac within the uterine Cavity

1. Gestational Sac: Implantation of the blastocyst is complete by day 23 menstrual age. At that time conceptus measures 0.1 mm and is beyond the resolution of current ultrasound equipment. The earliest sonographic sign of intrauterine pregnancy was described by Yeh and colleagues[2], who identified a focal echogenic zone of decidual thickening at the site of implantation at 3.5 to 4 weeks' menstrual age. This sign may be difficult to appreciate. Endovaginal color flow Doppler (EVCFD) may provide the first reliable evidence of the presence of an intrauterine pregnancy . Peritophoblastic flow characterized by high-velocity, low-impedance signal is seen. In the series of Emerson and coworkers, the sensitivity of diagnosis of intrauterine pregnancy was improved from 90 % of Endovaginal sonography (EVS) alone to 99 % using EVCFD. The specificity of diagnosis of intrauterine pregnancy with EVCFD was 99 % to 100 % [3].

TABLE-1. Normal Endovaginal Sonographic Findings: 3.5 to 6.5 Weeks` Menstrual Age

Approximate Menstrual Age (wk)	Sonographic Signs	Sonographic Features	Comments
3.5-4	Decidual thickening	Focal thickening of the echogenic decidua at the site of implantation	Sign difficult to appreciate predictive value never published
? after 4.5	Trophoblastic flow	High-velocity, low - impedance signal at the implantation site	Peak velocity of 8-30 cm/s Prior to visualization of the gestational sac
4.5-5.5	Intradecidual sign	Gestational sac within the Decidua abutting the endometrial canal	Should always be seen when maternal serum B-hCG is 1700-2000mIU/ml (First International Reference Preparation)
after 5.5	Double-decidual sign	Echogenic ring formed by decidua capsularis/chorion leave surrounded by echo-genic decidua vera	Vague or absent sign nondiagnostic
after 4.5	Yolk sac sign	Visualization of the yolk sac within the gestational sac	Yolk sac often seen when MSD is 5-6 mm and always seen when MSD is 8 mm
5.5	Double-bleb sign	Visualization of the amnion as a 2-mm bleb adjacent to the yolk sac	Trasient finding; after this stage, visualization of the amnion in the absence of a visible embryo is abnormal
after 5-5.5	Visualization of the embryo	Visualization of the embryo adjacent to the yolk sac	Embryo should always be seen when the MSD is 16 mm
after 5-5.5	Cardiac activity	Cardiac activity within embryo immediately adjacent to the yolk sac	Nonvisualization of cardiac activity may be completely normal in embryos 4-5 mm CRL

The first reliable gray-scale sonographic evidence of intrauterine pregnancy is visualization of the gestational sac within the thickened decidua, is

referred to as the intradecidual sign. Using EVS, is usually possible to identify the gestational sac within the decidua by approximately 4.5 weeks menstrual age, when the MSD should be approximately 2.5 mm. The double-decidual sign is based on visualization of an echogenic ring formed by the decidua capsularis and chorion leave eccentrically located within the echogenic decidua vera. Originally described by Nyberg and associates and can often be identified by about 5.5 to 6 weeks menstrual age at approximately the same time that the yolk sac becomes visible with EVS

2.Yolk Sac:

The yolk sac is involved in transfer of nutrients to the embryo, in hematopoiesis, and in formation of the primitive gut. It is normally round or oval and has a uniformly thick, echogenic wall, can often be demonstrated by EVS when the MSD is 5 to 6 mm and it is often seen before visualization of the embryo or amnion[4]. Using EVS the yolk sac should always be visualized when the MSD is at least 8 mm. The yolk sac grows at a rate of 0.1 mm per millimeter of growth of the MSD before 15 mm MSD, after which it grows at a rate of 0.03 mm per millimeter of growth of the MSD.

Fig 2: Transvaginal Sonogram showing a well defined thin ring of yolk sac within the gestational sac.

3.Embryo and Amnion:

At approximately 5.5 weeks menstrual age, the amnion may normally be visualized before the embryo as a 2-mm bleb adjacent to the yolk sac. This transient finding was originally described by Yeh and Rabi Nowitz[5] and is referred to as the double-bleb sign. Visualization of the amnion without an embryo after the double-bleb stage is abnormal. Chorionic fluid is often more echogenic than the essentially anechoic amniotic fluid. Sonographic differentiation between the amnion and the chorion is usually not difficult in first trimester and allows for reliable determination of amnioicity and chorionicity in multifetal pregnancies.

Using EVS, embryos as small as 1 to 2 mm in CRL can be identified routinely. The embryo should reliably be identified when the MSD is 16 mm or large with optimal scanning parameters using high-resolution EVS. Cardiac activity may be identified immediately adjacent to the yolk sac and is indicative of a live embryo. The absence of cardiac activity however, does not necessarily indicatee mbryonicd emise.U singE VS,a bsent cardiac activity may be normal in embryos up to 9 mm in CRL.

4.Cardiac Activity:

The cardiovascular system is the first to develop and function, fetal pulsations can be elicited by TVS as soon as the embryo is visible, i.e. 2 mm long by 5th week. At 5th week embryonic heat rate is 123 bpm and by 9th week it is 171 bpm.

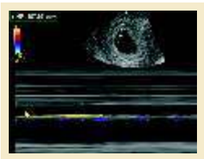

Fig 3: Transvaginal sonogram early pregnancy demonstrating cardiac activity and heart rate measurement.

5.Umbilical Cord

Earliest period at which umbilical cord can be seen by TVS is 8th menstrual week. It is the best landmark for ultrasound guided chorionic biopsy.

Biometric Data in First Trimester

There are various ways by which gestational age can be assessed in the first trimester 1)Uterine length (obsolete and historical) 2) Gestational sac volume and diameter 3) Embryo length (CRL) 4) Biparietal diameter of head (10-12 weeks)

Gestational Sac by transabdominal approach :

The gestation sac can be routinely measured by 5 weeks +, while with vaginal sonography from 4/ 1–2 weeks onwards. Chorionic cavity could be detected in all intact uterine pregnancies. It can be measured as a volume or as a mean sac diameter. The volume is measured by two techniques:

1) Using the formula of the ellipsoid (Reynolds, 75) Volume = D1 µ D2 µ D3
2) The planimetric method (Robinson, 75). The only potential use of the gestational sac measurements is limited in between 4.1-2 to 6 weeks before CRL can be measured.

2. Crown Rump Length : Once the embryo is visible, measurement of the CRL supercedes GS measurement. There are potential sources of error in obtaining the CRL. The assumption is that the longest CRL obtained is the correct one. Pitfalls to be aware of are inclusion of the YS or other nonembryonic structure or artefact within the measurement and the curvature of the embryo. The accuracy of estimation of gestational age is within 3 to 5 days of the true age.

A rapid rule of thumb for quick calculation is to add 6.5 to the CRL to get gestational age in weeks. There has been an ongoing debate about whether CRL or BPD is more accurate indicator of fetal age. Drumm found 100 percent of the fetuses were born within + 10 days of first trimester CRL prediction while only 32 percent of the fetuses were born within + 12 days of second trimester BPD predictions.

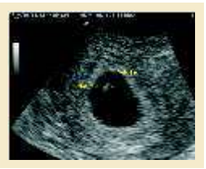

Fig 4 : Transvaginal Sonogram for early pregnancy showing the fetal pole and CRL measurement corresponding to 5 weeks 5 days.

First Trimester Pregnancy Problems

1. Blighted ovum
2. Abortions: Threatened, (subchorionic crescent sign)
   Incomplete, Complete and Missed Abortion.
3) Multiple pregnancy
4) Vanishing twin
5) Ectopic pregnancy
6) Pregnancy in bicornuate uterus
7) Vesicular mole
8) Pregnancy associated with ovarian cyst and fibroids

Ultrasound (TVS) offers the best noninvasive modality of diagnosing the above first trimester pregnancy problems. TVS is safe and will not mechanically disturb the pregnancy as, the probe is a small distance away from the cervix. The goals of evaluating here would be:

1) To detect abnormal pregnancy early and shorten period of uncertainty
2) To avoid premature intervention. Fetal outcome in Threatened abortions can be predicted by
   a) Positive fetal heart after 8 weeks LMP is associated with a continuation rate of 90 percent.
   b) Positive fetal heart with no crescent (no subchorionic bleed): 95 percent continuation rate.
   C)Positive fetal heart with crescent hemorrhage is associated with 70 percent continuation rate.

Blighted Ovum

When the GS is atleast 25mm in diameter and no embryonic structures can be seen it is termed a blighted ovum. This is synonymous with anembryonic gestation.

Missed Abortion

The traditional definition of missed abortion is fetal death before 20weeks menstrual age without expulsion of the fetus for atleast 8 weeks afterwards. This is obviously an inappropriate definition now as USG is able to identify an embryo without a heartbeat from 6 weeks on.

Vanishing Twin

Where one sac undergoes embryonic resorption.

Vesicular Mole

Classical snow storm appearance seen at 9 weeks gestation.

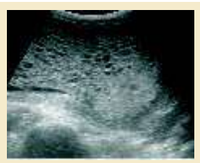

Fig 5 : Transabdominal Sonogram shows echogenicity within the uterine cavity with multiple, tiny, internal anechoic areas representing a Vesicular Mole.

Ectopic Pregnancy

The sonographic signs of ectopic pregnancy are [6], Negative signs i.e. Intrauterine pregnancy, False-negative sign i.e. Intrauterine pseudogestational sac Indirect positive sign i.e.

a) Empty uterus sign
b) Free pelvic fluid (blood). Direct positive signs include adnexal pregnancy, living embryo, tubal or adnexal ring sign, complex or solid mass

Fig 6 : Transvaginal Sonography shows a live Ectopic Pregnancy.

Transvaginal Color Flow Doppler : Adnexal peritrophoblastic flow is defined as high velocity, low resistance flow separate from the ovary. TVCFD may aid in confirming the presence of an ectopic pregnancy, its value depends on the strictness of grey scale criteria for diagnosis of ectopic pregnency.

EARLY PREGNANCY FAILURE The most accurate indicator of a live embryo or of embryonic demise is sonography. The sonographic diagnosis of early pregnancy failure depends on the stage of development Ultrasound Signs of Pregnancy failure:

1. Sonographic findings associated with abnormal intrauterine pregnancies

A. Gestational sac : Shape irregular or bizarre, Position low in uterine cavity, Growth less than 0.7 mm per day absent embryonic growth Large gestation sac, More than 16 mm lacking a living embryo.
More than 8 mm lacking a visible yolk sac

B. Trophoblastic reaction Irregular, Absent DDS findings. Thin trophoblastic reaction less than 3 mm intratrophoblastic venous flow.

C. Yolk sac and amnion : Large yolk sac or amnion without a visible embryo.Yolk sac more than 5.6 mm between 5-10 weeks.Thin yolk sac, Calcified yolk sac and An abnormally thickened and expanded amnion, floppy amnion

D. Embryo : Absence of cardiac motion in embryo 5 mm or larger and absence of cardiac motion after 6.5 menstrual weeks.

2. Sonographic findings with a living embryo associated with a poor prognosis

A. Bradycardia [7]

CRL	FHR
< 5 mm	< 80 bpm
5-9 mm	< 100 bpm
10-15 mm	< 110 bpm

B. Growth retardation : Discripancy in size of embryo and gestational sac of first trimester. A gestational sac less than 4 mm larger than crown rump length is universally associated with subsequent demise.

C. Progestational hemorrhage [8]: Subchorionic hematoma in association with a viable fetus does not necessarily predict a poor prognosis when it is less than 50 mm in size, but may be associated with bleeding in first trimester.

EVCFD predictors of pregnancy failure : Inadequate trophoblastic invasion of the spiral arteries may be seen in early pregnancy failure and may be associated with increased resistance to flow in the spiral arteries. One study suggests

that an abnormal resistive index (higher than 0.55) in the decidual spiral arteries and active arterial blood flow in the intervillous space may be associated with an increased incidence of early pregnancy failure.

FETAL ANOMALIES

Diagnosis of gross anomalies such as cystic hygromas and large cranial cyst can be made in the first trimester with either TVS or EVS [9]. Many severe anomalies may have a normal sonographic appearance in the first trimester. The most dramatic example is anencephaly, which may only become obvious after ossification of the calvarium occurs at 12 weeks` menstrual age.

In the first trimester, normal embryologic anatomy may mimic the sonographic appearances of fetal anomalies of developmental stage. The fetal rhombencephalon appears as a cystic structure in the posterior fossa beginning at 7 weeks menstrual age and should not be mistaken for an intracranial cyst or hydrocephalus.

Physiologic midgut hernia is often demonstrated as a small (6 to 9 mm) echogenic mass protruding into the umbilical cord at approximately 8 weeks menstrual age and is still present in 20% of normal fetuses at 12 weeks.

FIRST TRIMESTER MASSES

Ovarian Masses: The commonest mass seen in the first trimester of pregnancy is the corpus luteum cyst[10]. Corpus luteum cysts may be occasionally more than 10 cm in diameter. Internal septations and echogenic debris may be seen. Corpus luteum cysts usually regress or have decreased in size on follow-up sonographic examinationa t1 6t o1 8w eeksm enstruala ge. Other cystic masses may appear initially in the first trimester of pregnancy because of displacement by the enlarged uterus. Although malignant ovarian neoplasm associated with pregnancy is rare, torsion, rupture, or dystocia is not. Dermoid cysts may present a characteristic appearance of a cystic mass with focal calcification and a fluid-fluid level.

Uterine masses :

Uterine fibroids are common pelvic masses often identified during pregnancy. Most fibroids do not change in size during pregnancy. Some fibroids, however, may enlarge rapidly because of stimulation by estrogen. Fibroids may be differentiatedf romf ocalm yometrialc ontraction by the transient nature of myometrial contractions. A repeat examination 20 to 30 minutes after the initial examination reveals the absence of a focal myometrial contraction, whereas fibroids are still present. Fibroids also may distort the uterine contour (serosal surface), whereas focal myometrial contractions usually do not.

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IMAGE

PREGNANCY INDUCED HYPERTENSION (PIH).

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'One who does not think and plan ahead will find trouble right at her door'.

Confucious

Disease of many theories, known from centuries back, PIH is an enigmatic condition of pregnancy. The disease can't be predicted, can't be prevented, can't be treated absolutely. From definition to conclusion, it is only controversies and controversies. Over the years there are so many definitions, the most common definition being, 'Hypertension that develops de novo as a consequence of pregnancy after 20 th week of gestation,r eturningt on ormala fter6 w eekso f delivery'P IHi sp resentw hend iastolicB P>9 0 mmHg,S ystolic> 140o ra s ystolicB Pr isesa t least 30 mmHg over base line values or diastolic BP rises at least 15 mmHg over base line value. Now the consensus recording is K5 for diastolic pressure.

Types of PIH are.

- **Gestational Hypertension-** Hypertension alone with no associated features.
- **Pre eclampsia-** Hypertension with proteinuria of at least .3 g in 24 hours. It may be Mild, Severe, and Eclampsia(can be taken also as complication.) The incidence varies from 7 to 15 %, and is influenced by age, parity, racial, socioeconomic and genetic factors.

Diagnosis-.

PE is a syndrome (a group of symptoms or signs) which can be recognized, but not diagnosed because there is no specific diagnostic tests. Symptoms and signs of the disease are, proteinuria, generalized oedima, hyperuricemia., increased hematocrit, thrombocytopenia, reduced antithrombin III, abnormal liver function tests. abnormal uterine artery Doppler waveforms, abnormal fetal doppler waveforms, IUGR and fetal hypoxia. Severe PE is characterized by BP >- 160 mmHg Systolic ,- 110 mmHg diastolic,Protinuria >-.5 gm /24 hours, Oliguria <- 400 ml /24 hrs, cerebral or visual disturbances. epigastric pain, pulmonary oedema or cyanosis, impaired liver function and thrombocytopenia.

Management consists of screening, prevention, maternal assessment, anti hypertensive therapy, anticonvalescent therapy, fetal management, care in puerperium and follow up, the aim being early recognition of PE, so that increased laboratory and ultrasound surveillance and timely intervention can reduce the risk of maternal and fetal complications.

Predicting who is going to suffer from hypertension or preeclampsia during their pregnancy with a very high degree of certainity is just not possible, though it is possible to identify a group of women at risk, the maternal group being, history of previous PE ,increasing maternal age, increased interval between pregnancy, family history, patient requiring oocyte donations, chronic insulin resistance , gestational diabetes, Type I diabetes mellitus, antiphospolipid antibodies, hyperhomocysterinaemia. The Exogenous factors are smoking, stress, psychosocial stress . Pregnancy associated conditions which may predispose to PIH are multiple pregnancy, UTI, Hydrops fetalis, Trisomy 13 and hydatidform mole.

As we cannot predict, who is going to suffer from PIH with any accuracy, the preventive treatment remains some way off. Types of prevention are Primary, Secondary and Tertiary.

As pregnancy is the cause, contraception, and not becoming pregnant are the absolute. preventive measures .Long term sperm exposure and to stay with the same partner, prevention of obesity,I nsulinr esistance, a nd s moking.a re other measures.

Secondary prevention may be non pharmacological or pharamocological.
Non pharmacological measures are bed rest, Yoga, , dietary sodium restriction. Change in dietary habits, Fish oils, arginine supplementation. But they have no data to support their benefits Control of obesity is not recommended during pregnancy. Alcohol intake is not useful and Japanese herbal medicine is still in experimental stage.(1)

As regards pharmacological interventions, aspirin intake causes 19% reduction in risk of PE. 16 % reduction in fetal and neonatal death. 8 % reduction in the incidence of small for gestational age infants The controversy is when to start treatment..(2)

Folic acid and B6 prevents Hyper homocystenimia,b utt herei sn os cientificd ata that any of the B vitamins prevent Pre eclampsia. Diuretics can't be recommended for prevention.
Calcium has got protective effect in women with low calcium intake(3 Supplementation with 1.5 gm calcium /day did not result in statistically significant decrease in the overall incidence of PE, but there is significant decrease risk of the more serious complication which included maternal and neonatal morbidity and death and preterm delivery Zinc, and Magnessium has no evidence in preventing PIH.

Antioxidants like Vit C, E, and lycopene found to be effective in smaller trials. But VIP Trial demonstrated no decrease in risk of PE.(4) In the other large multicentric trial, the supplementation did not decrease the incidence of peeclampsia, IUGR or the risk of death or other serious outcomes.(5In Tertiary prevention, proper ANC is the key, along with identification of patients with risk factors and early referral and timely delivery, with measures to prevent complication.
The management can be done in home, day care unit or in hospital.

DAU management-
Four to 6 times BP is recorded. Mid stream urine analysis is done .If protinuria is there protien creatinine ratio is estimated. CTG, Hb, platelates, creatinine, liver function(enzymes, AST/ALT), uric acid estimations are done and the case is reviewed from time to time.

Admission to Hospital from DAU is done in case of severe PE where BP, is 170/110 mmHg at any stage IUGR, symptomatic hypertension, for planning delivery for bed rest, Labortary Evaluation, Anteparum surveillance like USG, NST, CST, Umbilical artery Doppler velocity form and urine for protein.
In hospital BP is measured, if unstable, the patient is considered for antihypertensives, sometimes even for delivery. The treatment aims at delaying the delivery for 15 days. If the risk benefit ratio is more, immediate termination of pregnancy is done. (WHO-2006) (6)

The antihypertensive drugs of choice are Methyl Dopa, Labetatol and Nifedipine.
Nimodipine, though came up with big hope, is still in research stage. Atenelol increases IUGR, ACE inhibitors, diuretics and angiotensin receptor blockers are contraindicated.

Choice depends on the availability, experience and the familiarity. Benefits of antihypertensives are, it can prolong the pregnancy for 15 days, reduces the severe hypertensive crises like, abruptio placentae, seizures etc., increases birth weight very slightly with no overall difference about the risk of PE, preterm birth and admission to SCBU or risk of fetal or neonatal death. In severe PE, Hydralazine (IV) is given for acute managemento fs evereh ypertension,L abetatol given orally or intravenously, and Nifedipine given orally. Concern about combination of nifedipine and magnesium sulphate is unfounded. (7)

In Eclampsia, resuscitative measures are under taken immediately. Antihypertensives and MgSO4 therapy are instituted and termination of pregnancy is done. Detail management of eclampsia is beyond the scope of this chapter. As prophylaxis, MgSO4 is used only on hospitalized PE cases during labour and 12 to 24 hours post partum. There are inadequate data to evaluate the efficacy of MgSO4 in preventing convulsion in patients with mild PIH. In severe PE, it does not affect other serious maternal complications such as pulmonary oedima, stroke, liver hematoma or renal failure.

Plasma volume is reduced in PE as well as serum albumin. Expanding plasma volume has been suggested . The Yorkshire Guidelines suggests 80 ml/hr fluid replacement , the main objective being to improve neonatal outcome.

Expectant management in selected patients reduces neonatal morbidity, with no increased maternal morbidity. Usually there is a latency period of 15.4 days on average.

Termination is done in severe PE, <25.27 weeks or >34 weeks. Controversy is there, when the pregnancy is between 28 to 34 weeks. Once it is decided that, delivery is necessary, labour induction should be done with out delay. In HELLP Syndrome prompt delivery is done, if it developsb eyond3 4w eeks.B efore3 4w eeks, administrations of corticosteroid for 48 hrs is given for both maternal and fetal benefits.

Management of PE is complicated by presence of fetus, delivery being the ultimate cure.
Befitting the mother, treatment may result in premature birth., hence decision of delivery is critical.. A rushed delivery in an unstable patient or delay in delivery in a sick patient is bad for both the mother and fetus.

Indications of delivery are, inability to control blood pressure, detorioting liver or renal function, symptom and signs of imminent eclampsia, fetal distress in CTG, failure in growth , abnormal umbilical artery Doppler findings in growth restricted fetus. During the intrapartum period care is taken to prevent seizures and stabilize BP. Continuous electronic fetal heart rate and uterine activity monitoring should be there.

Thet ypeo fd eliverym ayb eV aginalo r L SCS which is done for obstetric reasons, or before 32 weeks of gestation. General Anesthesia is to be avoided, as it increases blood pressure during

intubation and extubation and epidural is better than spinal. In post partum period, the patient is kept under close observation, MgSO4 infusion continued for prophylaxis. Diuresis occurs with in 24 hrs, till that time the treatment should continue.

Careful fluid balance is kept with decrease dose of antihypertensives. Long term follow up is done to make sure that the blood pressure falls. If it does not Fall, suitable referral is done. As regards long term prognosis PE and Eclampsia are a forerunner of later life cardiovascular risk It is more in early onset PE. Does not affect long term renal function and has no long term residual hepatic disease. The recurrence Risk is 20 to 50 %. and the risk of HELLP syndrome is 2 to 6 %. Preconception counseling should be done before the next pregnancy about the recurrence of PE. They are at risk for cardiovascular disease. Hence lifestyle and risk factors modification advise has to be given.

To conclude, maternal and neonatal outcome is good in gestational PIH. With antihypertensive drugs they can go up to term. But PE is enigmatic, an unique syndrome, dangerous for both mother and fetus. No absolute preventive measure exist and they, do not respond well to treatment. Close medical supervision and timely delivery are the keys.

'No man, no author, not even the greatest , ever provide the last word on any thing.'
-Mechal de Montaigne

So , Dear Friends, what ever is told here is not the last word.

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DIAGNOSIS AND MANAGEMENT OF IUGR

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INTRODUCTION

The identification of pregnancies at risk for preventable perinatal handicap is a primary goal of the obstetric care. Next to prematurity, intrauterine growth restriction (IUGR) is the second leading cause of perinatal mortality[1] . As many as 53 percent of preterm stillbirths and 26 percent of term stillbirths are growth restricted.[2] In survivors, the incidence of intrapartum asphyxia may be as high as 50 percent.[2]

The ultimate growth potential of placenta and the fetus are genetically predetermined, as indicated by their relationship with the maternal body mass index and ethnicity. This genetically predetermined growth potential is probably further modified by other maternal, placental, and fetal factors that finally determine the size of the individual at birth.

Definitions

The currently accepted classification of birth weight as very small for gestational age (<3rd percentile), small for gestational age (SGA, <10th percentile), appropriate for gestational age (AGA, 10th to 90th percentile) or large for gestational age (>90th percentile)[3]. If the fetus is in the lower centiles but continues to grow within those centiles, this is reassuring but if growth is slow and the fetus is falling into lower centiles, this is cause for concern.

In accurately dated pregnancies, approximately 80–85% of fetuses identified as being SGA are constitutionally small but healthy, 10–15% are 'true' IUGR cases, and the remaining 5–10% of fetuses are affected by chromosomal/structural anomalies or chronic intrauterine infection.[4] The sequelae of IUGR include fetal distress, intrapartum asphyxia, meconium aspiration, stillbirth, detrimental effects on neuro-developmental progress in childhood, and higher risks of degenerative diseases (eg. hypertension, medical renal disease, vascular disease, diabetes Barkers hypothesis) in adulthood.[5]

Detection of IUGR:

Clinical methods: Abdominal palpation, weekly measurement of symphyseal fundal height[SFH] and abdominal girth are the clinical parameters used to diagnose IUGR. There is enough evidence that SFH measurement performs better if the charts used to plot SFH are customised to match particular variables affecting fetal growth in fetuses of different mothers[6,7] Investigations : Methods employed to detect SGA fetuses include, ultrasound biometry, ultrasound estimated fetal weight and ultrasound Doppler flow velocimetry. There is evidence that it is the trend (growth) that is of more value in predicting poor fetal outcome in most situations. important prognostic factors for SGA, such as maternal height, weight, ethnicity, parity and fetal gender should be considered. Use of such customised charts was found to result in improvement in sensitivity (48% from29% of non-customised charts).[8]

Role of Ultrasound :

USG biometric parameters: Abdominal circumference[AC] estimated fetal weight[EFW], Femoral length[FL], head circumference[HC], Biparietal diameter[BPD]

USG Prognostic parameters: Growth velocity, Uterine artery Doppler, Amniotic fluid volume[AFV], umbilical artery Doppler, Umbilical venous Doppler, biophysical profile. Abdominal circumference (AC) and estimated fetal weight (EFW) are the most accurate diagnostic measurements to predict SGA. In high-risk women, AC at less than the tenth centile has sensitivities of 72.9–94.5% and specificities of 50.6–83.8% in the prediction of fetuses with birth weight at less than the tenth centile[9]. The respective figures for EFW are sensitivities of 33.3–89.2% and specificities of 53.7–90.9%.

Use of growth velocity: Serial measurements of AC and EFW (growth velocities) are superior to single estimates of AC or EFW in the prediction of FGR (abnormal neonatal ponderal index and skinfold thickness) and predicting poor perinatal outcome. However, use of fetal growth alone to diagnose growth restriction (especially when the interval between the scan is less than two weeks) can lead to high numbers of false positives. Ratio measures, such as head to abdominal circumference (HC/AC) and femoral length to abdominal circumference (FL/AC) ratios are poorer than AC or EFW alone in predicting SGA or neonatal ponderal index.[10] Accurate surveillance of fetal growth requires certainty of gestational age and this is ideally established through first trimester ultrasound scanning (USS) with an accuracy to within 5 days, while second trimester scanning should be accurate to within 10 days. Once gestational age is known, antenatal assessment aims to determine if fetal growth is progressing normally over time.[6] For those fetuses found to have abnormal growth velocity, Doppler assessment is indicated.

Management of an IUGR affected pregnancy: Once abnormal fetal growth has been detected, aetiology should be determined by considering fetal chromosomal or structural anomalies, or intrauterine infection and the other known causes of impaired fetal growth. Appropriate investigations vary depending on the stage of pregnancy at which the problem is detected and whether the fetus is symmetrically or asymmetrically growth restricted Assessment for chromosomal defects Up to 19% of fetuses with an AC and EFW less than the fifth centile may have chromosomal defects,[11] karyotyping may be required in these cases.

Surveillance of the small fetus

Use umbilical artery Doppler as the primary surveillance tool: A variety of descriptor indices of umbilical arterial Doppler waveform, such as resistance index, systolic/diastolic ratio, pulsatility index and diastolic average ratio, is used for predicting perinatal outcome When an anomaly scan and umbilical artery Doppler are normal, the small fetus is likely to be a 'normal small fetus.'[12]

AFI measurement: Measure liquor volume using AFI or pocket depth. Reference range for AFI has been devised by author[13] for Indian subset of population for better perinatal outcome.

Use biophysical profile: The biophysical profile has not been shown to improve perinatal outcome. However, there is evidence from uncontrolled observational studies that biophysical profile in high-risk women has good negative predictive value, i.e. fetal death is rare in women with a normal biophysical profile[14]

Use of cardiotocography (CTG) antepartum to assess fetal condition is not associated with better perinatal outcome; however daily NST is practiced in many centers.

Delivery: *The goal is to delay delivery as long as possible to achieve fetal maturation and, hopefully, ensure viability while avoiding the sequelae of fetal acidaemia.*

General guidelines: There is general consensus that delivery is indicated when the risk of fetal death or significant morbidity from continued intrauterine existence is greater than the risk of prematurity. It is vital to weigh the risks of IUFD and risk of NND due to prematurity. When end diastolic flow is present (PED), delay delivery until at least 37 weeks, provided other surveillance findings are normal. Absent or reversed end diastolic flow is associated with increased perinatal mortality and morbidity. The incidences of respiratory distress syndrome and necrotising enterocolitis are not increased with absent or revered end diastolic volume but there is an increase in cerebral haemorrhage, anaemia and hypoglycaemia. When end diastolic flow is absent or reversed, admission, close surveillance and administration of steroids are required. If other surveillance results are abnormal (poor biophysical profile, pulsations on venous Doppler), delivery is indicated. if growth is static between two scans 2 weeks apart in a fetus more than 32 weeks, delivery may be appropriate (once steroids have been administered to those 34 weeks). If gestation is over 34 weeks, even if other results are normal, delivery may be considered.

Literature review does not prove the value of oxygen therapy, nutrient therapy, hospitalisation and bedrest, betamimetics, calcium channel blockers, hormonal therapy and plasma volume expansion in treating growth restriction. But author believes that empirical therapies do help. Intermittent Oxygen therapy, balanced protein energy supplimentation improves the fetal weight and perinatal outcome. Macro and micronutrients given to mother along with bed rest helps improve fetal parameters. High protein diet/ IV amino acids, glucose powder intake, DHA supplementation and vitamins and mineral supplementation should be given to mother. The Growth Restriction Intervention Trial (GRIT)[15] concluded that, in general, at gestations less than 31 weeks, delivery is best delayed if there is any uncertainty about the need for intervention. The GRIT has not provided evidence to date that 'early delivery to pre-empt severe hypoxia and acidosis reduces any adverse outcome'[16].

Delivery should be undertaken in a unit capable of providing intrapartum monitoring with continuous cardiotocography in labour and appropriate neonatal staff and facilities to care for the IUGR affected newborn. The decision on the best mode of delivery is based on the gestation, fetal condition, and cervical status. In cases where there is evidence of fetal acidaemia, caesarean section may be appropriate.

Conclusion:

Accurate dating is essential to allow careful monitoring and assessment of apparently abnormal fetal growth. Customisation of fetal growth assessment [SFH, birth weight,AC and AFIc harts]a ssistsi nd istinguishingt heh ealthy small fetus from one affected by IUGR. The primary intervention in an IUGR affected pregnancy is to ensure delivery of the baby at the optimal time, balancing the risks of fetal compromise from uteroplacental dysfunction against those of prematurity.

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Rh isoimmunisation in Pregnancy

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INTRODUCTION

The year 1940 became a landmark in medical history due to discovery of Rh group by Karl Landsteiner& A lexanderW ienerf romU SA. I n 1941, Levine found out that the cause of erythroblastosis fetalis was maternal isoimmuization. Today, it has become a preventable condition due to the pioneering research of Freda & Gorman (1961)[1].

Incidence : Varies from 2-5% in India 2 to 15-17% in Europe.

Pathogenesis :-

Isoimmunisation results from production of antibodies in an individual (mother) in response to antigen (Rh+ve) from the other individual (fetus) of the same species , in absence of the antigen (Rh-ve) in the first individual. These are called maternal alloantibodies. They cross the placenta and cause different severity of fetal affection like hydrops fetalis, fetal anemia & intrauterine death.

Besides Rh isoimmunization may be due to other antigens like keel, Duffy, Kidd & MNS blood groups. In the non pregnant Rh-ve woman, it may be caused by transfusion of Rh+ve blood.

Fetomaternal Haemorrhage in normal pregnancy is reported as 5% in I trimester, 16% in II trimester, 29% in III trimester and 50% at delivery.

This feto maternal leak may become accentuated in Spontaneous Abortion /MTP, Chorion Villus sampling, Amniocentesis, External cephalic version, Manual removal of placenta, Placenta Previa, Abruptio placenta, Intrauterine death, Caesarean section. Hence,it is recommended to give prophylactic[3] anti D in antepartum period in these cases.

Inspite of this inevitable leak, only 10-15% Rh negative mothers become sensitized. The reasons are :-

1) **Amount of hemorrhage**: As little as 0.25 ml of blood can cause sensitization. The IgM antibodies are produced, which cannot cross the placenta. After some weeks IgG antibodies are formed which cross the placenta & destroy fetal RBC.
2) **1/3 woman are genetically non-responders.**[4] **ABO incompatibility**:
   - ABO incompatible cells are rapidly clearedf romc irculationd uet op re-existent antibodies.

Presence of anti A or anti B antibodies in an O -ve mother destroys the fetal Rh antigen & thus renders it non immunogenic.

Maternal Complications observed are pre-eclampsia, poly hydramnios , PPH due to hyperplacentosis and Mirror -Syndrome: Mother develops pre-eclampsia and severe oedema similar to fetal hydrops due to vascular changes in the placenta.

Fetal Complications :

I) **Immune Hydrops** results from severe haemolysis of fetal RBC
Compensatorye rythropoiesiso ccursi ns pleen, liver & bone marrow. A compensatory hyperplacentosis also occurs to fight the anoxia. Ultimatelys everea nemia& c ardiacf ailurem ay cause it to be still born.
The clinical picture comprises of polyhydramnios, cardiac failure from severe anemia, generalized oedema, scalp oedema, ascites, pleural & pericardial effusion. Diagnosis is confirmed by USG which shows Buddha position with a halo round the head, large & swollen placenta and fetal hepato-splenomegaly

II) **Icterus Gravis** Neonatorum where baby is born well but becomes jaundiced within 24 hours. This is so because earlier the excess bilirubin was getting cleared through the placenta into the maternal circulation, but now the placental circulationc ann ol ongert akep lace.T heb aby becomes anemic, jaundiced & can develop DIC , thrombocytopenia, necrotizing enterocotilis & Kernicterus.

III) **Congenital anaemia of the newborn** . This is the mildest form of disease where anaemia develops without any jaundice. The Hb may be <10gm/dl. There is pallor and hepatosplenomegaly. The destruction of RBC can occur only up to 6 weeks after which no antibodies are available.

Investigations include blood group of husband, Indirect Coomb's Test, USG & Doppler, amniocentesis and cordocentesis.

Managment of Non-immunisd Rh negative mother :-

1) In Rh negative husband management is like normal pregnancy.
2) If husband is Rh positive, do indirect Coomb's Test (ICT) in mother at her Ist visit. Repeat at 28 wks & 34 weeks. If it is negative, give 300 mcg anti D at 28 wks & continue pregnancy till term, repeating ICT every month. Do not allow to become postdate. At the time of delivery send cord blood for : Hb, ABO/ Rh , bilirubin & direct Coomb's Test.

- If baby is Rh positive, anti D within 72 hours in the dose of 300 mcg.
- If mother ICT is positive or fetus has positive direct Coomb's Test, then do not give anti D, as mother is already immunized.

Kleihauer - Betke Test : The test is done on maternal blood to assess the maternal leak . 80 fetal RBC in 50 low power fields, represent 4ml of fetal blood for which 100 mcg of anti D is required to neutralize it. RCOG recommends K-B test in all cases after 20 weeks. They also recommend

antenatal prophylaxis of 100 mcg anti D at 28 weeks and same dose at 34 weeks in all non immunized Rh negative mothers. RCOG also recommends 50 mcg before 20 weeks.

Other indications for anti D prophylaxis are abortion, MTP, Ectopic Pregnancy Hydatiform mole, Chorion Villus sampling, APH and MRP.

Management of the Immunized Rh Negative mother :-

1) Paternal Rh status is negative then proceed as normal pregnancy management. If positive determine if he is homozygous or heterozygous. If he is homozygous, the fetus will be Rh+ve and no amniocentesis will be required. If he is heterozygous, fetus has 50% chance of being Rh negative .

I) CVS or Amniocentesis to determine fetal Rh status.

II) Amniocentesis & amniotic fluid bilirubin estimation : This is done to estimate the severity of fetal affection. Done at 20 weeks underU SGg uidance(c olorD oppler).A fter centrifuging, the fluid is subjected to spectrophotometry.

Under normal circumstances, the Optical density reading between 350-650 nm form an almost straight line. In presence of bilirubin, ODw illp eaka t4 50m m,w iths izeo fp eak proportionate to amount of bilirubin.
Three zones can be obtained on plotting OD on ***Liley's Chart***[5] .

a) **lower Zone or Zone 1** is mildly affected fetus. Pregnancy can be carried to term. **b). Zone II or middle zone** - fetus in moderately affected. Amniocentesis and or USG is repeated . Sometime PTD may be required. **b) Zone 3 or upper zone** represents a severely affected fetus, who would die within a week if not treated by intravascular transfusion.

III) **Cordocentesis** is done to obtain fetal blood from umblical vein from cord at placental insertion under sonographic guidance. Assess the blood group & fetal haematocrit. If < 30%, Intarvascular transfusion is done with O Rh Negative blood, to increase the haematocrit to 50%. The procedure may need to be repeated until fetus is mature to deliver .

IV) **Type of delivery** : Caesarean section is reserved for obstetrics indications.
The combination of antenatal prophylactic and postpartum anti D administration has successfully reduced the Rh-negative hemolytic disease in the newborn.

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ANTEPARTUM HAEMORRHAGE (APH)

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Antepartum hemorrhage is defined as bleeding from or into the birth canal after the 24th weeks of pregnancy.. APH affects 3-5% of all pregnancies It is three times more common in multigravidas than primigravidas.

Aetiology :

1) About 40% of all pts who present with antepartum bleeding are unexplained

2) **Placenta praevia**: When the placenta, is implanted partially or fully , in the lower uterine segment , it is called placenta praevia. The pts who has history of prior cesarean section, history of uterine curettage, increasing maternala ge, m ultipleg estation, p lacenta praevia in previous pregnancy are known to be high risk category. They are classified into four grades like..Grade I: Placenta encroaches lower segment but does not reach the internal os. Grade II: Reaches cervical os but does not cover it. Grade III: Covers part of the cervical os. Grade IV: Completely covers the os, even when the cervix is dilated.

3) **Placental abruption** Normal placenta separates from the uterus prematurely and blood collects between the placenta and the uterus. The incidence of APH with this condition is about 20% of all cases that means in other words it can happen 1 in 200 of all pregnancies. The cause of placental abruption is unknown. Risk factors for placental abruption include: Increasing maternal age and parity, High blood pressure (140/90 or greater), Trauma (usually a car accident or maternal battering),Smoking, Prolonged rupture of membranes, Abruption in previous pregnancies (10% recurrence risk),

4) **Local causes**, e.g. vulval or cervical infection, trauma or tumours.

5) **Vasa praevia** (bleeding from foetal vessels in the foetal membranes):
- Occurs in about 1 of every 1,000 pregnancies.
- The baby's blood vessels from the umbilical cord may attach to the membranes instead of the placenta.

6) **Uterine rupture**:
   a. Rare but very dangerous for both mother and baby.
   b. About 40% of women who have uterine rupture had prior surgery of their uterus, including caesarean section.
   c. Other risk factors for uterine rupture are these conditions:

i. More than 4 pregnancies
ii. Trauma
iii. Excessive use of oxytocin
iv. Shoulder dystocia

v. Certain types of forceps deliveries
   d. The rupture may occur before or during labour or at the time of delivery.

7) Inherited bleeding problems are very rare, occurring in 1 in 10,000 women.

Placenta praevia : Women with placenta praevia present with antepartum bleeding which is painless and recurrent . Presenting part is usually high and not central to the pelvic brim. First episode of bleeding occurs, after 36th week in 60% women , at 32-36th week in 30% women , and before 32nd week in 10% women .

Diagnosis : While clinical acumen remains vitally important in suspecting and managing placenta praevia, the definitive diagnoses of most low-lying placentas is now achieved with ultrasound imaging. Clinical suspicion should, however, be raised in any woman with vaginal bleeding and a high presenting part or an abnormal lie, irrespective of previous imaging results.

Ultrasound imaging in screening for low-lying placenta and diagnosing placenta praevia : Transvaginal ultrasound is safe in the presence of placenta praevia and is more accurate than transabdominal ultrasound in locating the placenta. Numerous prospective observational studies have used transvaginal ultrasound scanning (TVS) to diagnose placenta praevia and none has experienced any haemorrhagic complications, thus confirming its safety.

With the lower segment still unformed in the secondt rimester,s creeningf orf uturep lacenta praevia at this time is inevitably associated with false positives, as not all low lying placentas will persist and this is especially so when TAS is employed. TVS can improve on this. Magnetic resonance imaging (MRI) has been reported in the diagnosis of placenta praevia where TAS images have been unsatisfactory.. It is particularly useful in imaging posterior placentas but has not been subject to comparison with TVS and can only be recommended for use in a research context at this stage.

Women in whom a low-lying placenta is suspected from their transabdominal anomaly scan (at approximately 20–24 weeks) to reduce the numbers of those for whom follow-up will be needed. A further transvaginal scan is required for all women whose placenta reaches or overlaps the cervical os at their anomaly scan as follows:
- Women who bleed should be managed individually according to their needs.
- Inc aseso fa symptomatics uspectedm inor praevia, follow-up imaging can be left until 36 Ar easonablea ntenatali magingp olicyi st o perform a transvaginal ultrasound scan on all weeks.
- In cases with asymptomatic suspected major placenta praevia, a transvaginal ultrasound scans houldb ep erformeda t3 2w eeks,t o clarify the diagnosis and allow planning for third-trimester

Diagnosis of a morbidly adherent placenta : Antenatal imagingb yc olorf lowD oppleru ltrasonography should be performed in women with placenta praevia who are at increased risk of placenta accreta. Where this is not possible locally, such women should be managed as if they have placenta accreta until proven otherwise.

Imaging antenatally allows for preparation for surgery but false positives do occur and the diagnosis should be confirmed intraoperatively to avoid inappropriate treatment.

Antenatal management : Women with major placenta praevia who have previously bled should be admitted and managed as inpatients from 34 weekso fg estation.T hosew ithm ajorp lacenta praevia who remain asymptomatic, having never bled, require careful counseling before contemplating outpatient care. The concern in caring for asymptomatic women with placenta

praevia major are that they will bleed suddenly and heavily, requiring urgent delivery. For this reason, traditional care has involved hospital admission during the latter part of the third trimester (commencing from 32–34 weeks) in women who have not previously bled who have placenta praevia major. There have been a number of observational studies to clarify which womena rem ostl ikelyt ob leed.R aiseds erum alphafetoprotein levels at 15–20 weeks and placentas which encroach on the os, are thick inferiorly or show turbulent flow at their lower margin by ultrasound imaging are most associated with antepartum haemorrhage.

It should be made clear to any woman being managed at home that she should attend hospital immediately if she experiences any bleeding, any contractions or any pain (including vague suprapubic period-like aches).

Prior to delivery, all women with placenta praevia and their partners should have had antenatal discussions regarding delivery, haemorrhage, possible blood transfusion and major surgical interventions, such as hysterectomy, and any objections or queries dealt with effectively. The use of cervical cerclage to reduce bleeding and prolong pregnancy is not backed up by sufficient evidence to recommend this practice outside of a clinical trial.

Tocolysis for treatment of bleeding due to placenta praevia can be useful in selected cases. However betamimetics were used in the studies to date and, as these are known to be associated with significant side effects, the agent and optimum regime are still to be determined: further research is needed in this area.

Prolonged inpatient care can be associated with an increased risk of thromboembolism. Thus, gentlem obilitys houldb ee ncouragedt ogether with the use of prophylactic thromboembolic stockings. Prophylactic anticoagulation should be reserved for those at high risk of thromboembolism and, in these cases, unfractionated heparin is to be preferred over the longer-acting low-molecular-weight preparations.

Delivery : The mode of delivery should be based on clinical judgment supplemented by sonographic information. A placental edge less than 2 cm from the internal os is likely to need delivery by caesarean section, especially if it is posterior or thick.

Decisions regarding mode of delivery will take into account clinical factors as well as ultrasound findings, especially if the fetal head has entered the pelvis. Ultrasound can add to this information, in terms of where the fetal head is relative to the leading edge of the placenta.The thickness of theencroaching tongue of placenta has been shown to influence outcome: the thicker the placenta(over1 c m),t hem orel ikelya bdominal delivery ..

Method of Anesthesia for Caesarean Section: Anesthesiologists are divided in their opinions regarding the safest method of anesthesia for CS with placenta previa. Two retrospective studies conclude that regional anesthesia is safe, and one small randomized trial suggests that epidural anesthesia is superior to general anesthesia with regard to maternal hemodynamics. When prolonged surgery is anticipated in women with prenatally diagnosedplacenta accreta, general anesthesia may be preferable, and regional analgesia could be converted to general anesthesia if undiagnosed accreta is encountered.

Surgery in the presence of placenta accreta, increta and percreta :
Women with placenta praevia who have had a previous caesarean section are at high risk of having a morbidly adherent placenta and should have been imaged antenatally. When placenta

accreta is thought to be likely, consultant anaesthetic and obstetric input are vital in planning and conducting the delivery. Crossedmatched blood should be available .

In the case of placenta accreta, increta and percreta, the risk of haemorrhage, transfusion and hysterectomy should be discussed with the patient as part of the consent procedure.

Where the placenta has been left in place at the end of the caesarean section , management varies , with some having prophylactic or therapeutic uterine artery embolisation,or internal iliac artery ligation at the same time as initial surgery, and some being treated following delivery with methotrexate. Successful pregnancies have been reported after this approach but there have been cases of delayed haemorrhage necessitating hysterectomy. In contrast, some cases have had no additional treatment after leaving the placenta in place and still had successful outcomes.

Massive haemorrhage : Uterotonic agents may help in reducing the blood loss associated with bleeding from the relatively atonic lower uterine segment, while bimanual compression, hydrostatic balloon catheterisation or uterine packing,or even aortic compression,can buy time while senior help arrives.Additional surgical manoeuvres which may be considered include the B-Lynch suture, uterine or internal iliac artery ligation or hysterectomy. Arterial embolisation has been reported and is useful in selected cases as long as the iliac vessels have not been tied off.

Related Issues : Risk factors for placenta praevia include previous uterine infection and/or surgery. This opportunity is taken to reiterate previous recommendations: screening for infection before termination of pregnancy and antibiotic prophylaxis to minimise the risk of postabortion infective morbidity Prophylactic antibiotics should beu sedf orc aesareans ectiona ndf orm anual removal of the placenta. In addition: the use of antenatal corticosteroids in threatened preterm delivery, anti-D immunoglobulin for who are women rhesus negative who bleed thromboprophylaxis for any woman at increased risk of thromboembolism , should be considered .

Placental abruption : The predominant sign of placental abruption is vaginal bleeding , present in 78% of the pts . Uterine tenderness and back pain are present in 66% of the pts Uterine hypertonicity seen in 17% pts . Fetal demise in 25% to 35% pts . DIC is a complication in approximately 13% of pts with abruption .Ultrasound rarely helps in the diagnosis of this condition . However , it is useful for assessing fetal presentation , fetal size , and fetal wellbeing .Sher proposed the following clinical grading for abruption :

Grade I : Includes those cases in which diagnosis of abruption is maid retrospectively . These pts had a retroplacental clot of appro. 150 ml , and a favorable outcome .
Grade II : Includes cases with classic features of abruption placentae and the fetus is live The retroplacental clot volume is usually 150 to500 ml , perinatal mortality is high .
Grade III : Incorporates features of grade II , but with fetal demise and /or coagulopathy .

Management of APH : Always admit a women with APH bleeding to hospital for assessment and management. She may need resuscitation measures if in shock . If severe bleeding or fetal distress is present , urgent delivery of baby irrespective of gestational age should be considered . Always admit to hospital, even if bleeding is only a very small amount. There may be a large amount of concealed bleeding with only a small amount of revealed vaginal bleeding. No vaginal examination should be attempted at least until a placenta praevia is excluded by ultrasound. May initiate torrential bleeding from a placenta praevia. Resuscitation can be inadequate because of under-estimation of blood loss and

misleading maternal response. A young woman may maintain a normal blood pressure until sudden and catastrophic decompensation occurs. Take blood for full blood count and clotting studies. Cross match as heavy loss may require transfusion. Gentle palpation of the abdomen to determine gestational age of fetus, presentation and position. Arrange urgent ultrasound. W ithe verye pisodeo fb leeding,a Rhesus negative woman should have a Kleihauer test and be given prophylactic anti-D immunoglobulin.

Further management: Further management will depend on fetal distress, the cause of the APH, extent of bleeding and gestation. In slight haemorrhage with blood loss less than 500 ml and no disturbance of maternal or fetal condition. Ultrasound shows placenta not lying in lower uterine segment, no retroplacental clots. Patient may be discharged or have baby induced if after 37 weeks and other conditions suitable.

In moderate or severe placental abruption:

- Restore blood loss, prevent coagulopathy, monitor urinary output. In moderate cases, give 1500 ml of blood, and in severe cases, give 2500 ml (first 500 ml transfused rapidly). Ideally measure central venous pressure (CVP) and adjust transfusion accordingly.
- Measure venous blood for coagulation 2 hourly, treat accordingly.
- Measure urine output 2 hourly. Oliguria may occur, but if sufficient blood has been given, then diuresis will follow birth.
- If fetus is alive, perform either caesarean section or artificial rupture of the amniotic membranes (restore blood volume first). Monitor fetus and switch to caesarean if fetal distress develops.
- Vaginal delivery is the treatment of choice in the presence of a dead fetus.

Complications of APH : Premature labour ,Disseminated intravascular coagulopathy, Renal tubular necrosis, Postpartum haemorrhage. Placenta accreta: placenta accreta complicates approximately 10% of all cases of placenta praevia.

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SECOND & THIRD TRIMESTER USG SCAN

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INTRODUCTION

During pregnancy it would be desirable to carry out Ultrasonography atleast once at around 18-20 wks of pregnancy. If possible, one USG exam. for each trimester even in low risk pregnancy. Second & third trimester ultrasonography can detect number of foetus / fetuses, (figure-1) lie, presentation, position and whether the foetus is alive or not. The environment of the foetus i.e. placenta & amniotic fluid can be studied in addition to routine examination.

During USG one should look for the followings:

- Head
- Neck
- Chest
- Abdomen
- Spine
- Limbs
- B.P.D., O.F.D., H.C.
- A.C.
- F.L.
- H.C. /A.C.
- F.L. /A.C.
- C.I.

B.P.D. : 1 B.P.D. can be measured from 15th week onwards. There are charts available now that show B.P.D. measurements from 9th week onwards, though it is not a sensitive parameter before 12th week of gestation.The plane in which B.P.D. should be measured includes :

a. Transaxial plane
b. At the level of Thalamic nuclei.
c. At the level of Cavum septum pellucidum
d. Slit like third ventricle in the midline
e. Antero posteriorly oblong plane
f. Thep arietalb oness houldb ee quidistant from mid
g. Measure widest diameter from outer skull table of anterior parietal bone to inner skull table of posterior parietal bone.
h. The plane of B.P.D. should be at right angles to mid line.

Use of B.P.D.: It estimates Gestational age, Foetal growth ,foetal weight, Structural anomalies of the head e.g. anencephaly, hydrocephalous, acrania, encephalocoele etc.

Errors in B.P.D. Measurement can occur due to incorrect plane, Interobserver error, engaged head, deflexed head, Improper machine setting.

Advantages of B.P.D. :

1) One can measure it in 95% cases
2) Well defined end points of measurement.
3) Relationship of B.P.D. & gestational age is extensively documented in literature.

Disadvantages of B.P.D. :

1) Accuracy of predicting gestational age decreases as pregnancy advances.
2) One gets incorrect measurement if the shape of the head is changed.
3) Inb reechp resentation,e ngagedh ead& i n multiple pregnancies if is not accurate.
4) There is either under estimation (IUGR) or over

estimation (Diabetes) in cases of deviation from normal growth.

Occipito – Frontal – Diameter (O.F.D.) : It is measured from mid point of frontal bone to mid point of occipital bone similar to B.P.D. plane. O.F.D. is important for measuring cephalic Index (C.I.)

$$C.I. = \frac{BPD}{OFD} \times 100$$

Normal C.I.: 75 – 85% , < 75% → Dolicocephaly, > 85% → Brachycephaly

Head Circumference (H.C.) : It is also measured in the same plane as B.P.D , outer skull table is used to measure the H.C. , the accuracy is + 2-3 weeks. It is ideal to be measured in cases of dolicocephalic or bracycephalic head , if the H.C. is below 2. S.D. for that period of gestation, possibility of microcephaly should be kept in mind.

Abdominal Circumference (A.C.) : It is measured in transaxial plane. The plane should be circular, showing lumber spine, stormal, liver & portal vein. It is a sensitive parameter for deviation of foetal growth & foetal weight estimation. Absence of stomach bubble is diagnostic of oesophagical atresia & presence of double bubble signifies duodenal atresia. If A.C. is below 5th percentile for that period of gestation, it suggests growth restriction. Whereas A.C. above 95th percentile for that period of gestation signifies macrosomia.

Femoral Length :[2] It is measured from greater trochanter to lateral condyle of femur. Exclude head & neek of femur. Do not include distal femoral epiphysis. It is measured for estimation of gestational age & the accuracy is + 2 weeks.

Ratios : The following ratios must be measured
1) BPD / OFD (Cephatic Index)
2) HC / AC : It is more than one before 36 weeks of gestation & at 36 week of gestation it is one. After 36 weeks of gestation, it is less than one deviation from normal raises suspicion of hydrocephalous or microcephaly.

3. FL / AC (Ponderal Index) : Normally it is 20-24 % & on an average around 22%. If it is more than 24%, then suggests IUGR.

USG Derived Foetal Weight : By use of B.P.D. & A.C. the foetal weight is calculated and in 90.5% of cases the accuracy is within + 300 gms.

High Risk Categories for Congenital Anomalies include previous cong. anomaly, advanced maternal age, B.O.H., exposure to teratogens, abnormal liquor, suspected fetal anomaly, diabetes, congenital Heart disease, I.U.G.R., consanguinity , single umbilical artery.

While doing USG of head one should look for mid line structures , ventricles, choroids plexus ,nose, Lips ,orbit, cerebellum , cistetna magna and posterior fossa .It is essential that above mentioned structures are visualized to pick up structural abnormalities especially in at risk patient.

While performing sonography of **neck** one should look for 1) soft tissue swelling a) Anteriorly thyroid b) Posteriorly Meningocoele / Meningomyelocele c) Cystic hygroma d) Turner's Syndrome which will be seen as cystic swelling around neck with septa within. 2) Cord round the neck and 3) Nuchal fold (skin) thickness. Up to 22 weeks for gestation one must look for Nuchal foetal thickness which is normally less than 6 mm and it looses its significance after 22 weeks of gestation.

During sonography of **chest** one should look for 1) Four chamber view of the heart, inflow & outflow tracts if possible. Eighty percent of congenital anomalies of the heart can be picked up by looking at four chamber view of heart. 2) Lungs 3) Any cystic or solid mass suggestive of congenital diaphragmatic hernia (C.D.H.) eigher on left side (stomach) or no right side (Liver).

During abdominal sonography stomach, liver, kidneys, urinary bladder, intestines & spine should

be observed in both transaxial and sagital planes.

Spines should be observed in all the three planes, Coronal, Sagital and transaxial. Look for three ossification centres, one for vertebral body & two for spine and also look at the overlying skin to detect meningocoele. Meningocoele is found commonly in rumbo-sacral region. Sagital plane is very important to detect splaying of the spine in cases of spina-bifida. Also look for presence of lemon-shaped head & banana shaped urchellums.

In Urinary System both the kidneys in longitudinal & transverse planes should be observed . Urinary bladder can be visualized in pelvis in most of the cases.Anomalies like absent kidney, hydronephrosis, hydroureter, posterior urethral valve obstruction, multicystic dysplastic kidneys etc. can be diagnosed.

Umbilical Cord :[3,4] It is a three vessel cord with two arteries & one vein. In upto 2% of cases absent umbilical artery can be picked up. Single umbilical artery may be found in upto 5% cases in multifoetal pregnancy. Look for congenital anomalies. Visualize placental & foetal insertion of umbilical cord.

All 4 Limbs should visualize in details. Each limb has 3 long bones & look for it. Spend time to visualize all the toes & fingers. Thorough study of limbs can help pick up achondroplasia, osteogenesis imperfecta etc. anomalies.

Placenta :[5] Visualization of site of placenta, whether anterior, posterior, right lateral wall or left lateral wall, fundal or praevia should be looked for and also for the size of placenta, thin or thick or normal. Grade of placenta should be ascertained as per Grannum's Classification, grade – O, grade – I, grade – II or grade – III. Look for abnormalities of placenta if any. Placenta shows three distinct layers after 12 weeks of pregnancy i.e. chorionic plate, placental substance & basal plate. It is hyperechoic compared to myometrium. Some studies have shown that placental thickness in mms. corresponds to gestational age in weeks. Many a times a placenta seen to be praevia in early weeks of pregnancy, appears to migrate away from internal os and lower segment. It is basically because of formation of lower segment (length 7 cms) from isthmus & preferential proliferation of placenta towards upper segment. In reality, a placenta does not migrate. Thick placenta can occur in Mat. diabetes, severe anaemia, Triplody, T.T.S. , Rh isoimmun, cong. neoplasm, I.U. Infections and Thin placenta can occur in severe mat. diabetes ,severe pre – eclampsia ,hypertension , placental Insufficiency, major foetal malformation.

Placental Pathologies :[6,7] Placenta praevia (lower edge of placenta within 5 cms of internal os), abruption of placenta, subchorionic fibrin deposition, intervillous thrombosis, perivillous fibrin deposition, placental infarction, placental chorioangioma, succenturiate lobe, circumvallate or circummarginate placenta should be looked for.

Amniotic Fluid : Visual impression of amount of liquor while doing USG will determine whether it is adequate or not. In case of doubt, do amniotic fluid index (A.F.I.). Measure largest amniotic pocket in cms. in each of the four quadrants of uterus or abdomen. Summation of amniotic fluid pockets in four quadrants given A.F.I. in cms. for that period of gestation. Chart showing range of A.F.I. at different periods of gestation is available. < 5 cm = oligohydramnios, 5-8 cms = borderline low, 8-18 cms = normal, 18-25 cms = borderline high & > 25 cms = polyhydramnios.

Cervix :[8,9] Cervix should be looked from internal os to external os on semifull bladder (300 cc urine) in both longitudinal & transverse plane. Determine the length of the cervix from internal to external os. Normally it is 2.5 cms to 6 cms, on an average 3.7 cms. If less than 2.5 cms., it is a short cervix. Look atd iametero fi nternalo si nt ransverses ection.

In patients with incompetent internal os, diameter of int. os more than 1.5 cms in second trimester is diagnostic. It is also important to look for lesions of the cervix likw fibroid, malignancy etc.

Lower segment, Myometrium, Adnexae: In case of previous L.S.C.S., look for thinning of lower segment at scar. Any scar less than 2.5 mm thick is a weak scar. Examination of myometrium for fibromyoma, bicornuate uterus etc. is necessary. While looking for adnexae one should remember that adnexae get lifted up into the abdomen as pregnancy advances.

Doppler Study : [10,11.] Whenever indicated one must subject the patient to colour Doppler study. On maternal side uterine artery should be studied on both the sides. On foetal side umbilical artery, descending thoracic aorta, middle cerebral artery & ductus venosus should be studied . Some authors have suggested study of inferior vena cava & umbilical vein also. Obstetricians must have knowledge of various indices (S/D ratio, R.I., P.I.) to interpret the colour Doppler study and to manage the patient accordingly .

Conclusion : Ultrasonography forms integrate part of antenatal management of a pregnant patient. It ist hem ostn on-invasivew ayo fa ssessingt he growth assessment of foetus in utero.

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PRETERM LABOUR : Prediction, Prevention & Management

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Preterm labour means onset of labour before 37 completed week. The lower limit of its onset is not uniformly defined worldwide . Incidence is 5 to 9 % of all deliveries worldwide. In India it is reported to be 10 to 15 %. Despite considerable advances in obstetric care , preterm labour continues to be a major cause of perinatal mortality and morbidity. 70 to 80 % of all perinatal deaths occur in preterm infants. With improved neonatal care even if the preterm baby survives the physical & mental handicap is considerable . Diagnosis of preterm labour is by ACOG 197 criteria i.e. uterine contractions 4 in 20 min or 8 in 60 min + progressive change in cervix (dilatation > 1 cm , effacement 80 % or more) . Threatened preterm labour means uterine contractions with formation of lower uterine segment but with no definite cervical change. There are many causes of preterm labour , still up to 50 % of cases there are no identifiable cause i.e. Spontaneous preterm labour. So warning signals in any antenatal patient should not be disregarded. These are menstrual like cramps, low dull backache, glairy mucoid vaginal discharge & feeling of pelvic pressure or heaviness in vagina. Fluid leaking per vagina & uterine contractions < 10 minutes apart, obviously heralds the onset of preterm labour.

Prediction of preterm labour :

Warning signals mentioned above are nonspecific. Risk scoring system devised by Papierneik & Creasy (score of > 10 considered highrisk for PTL) is not much useful, because half of the PTL cases occur in low risk patients. Home Uterine Activity Monitoring (HUAM) i.e. recording of contractions at home by external tocodynamometer is not found to reduce the incidence of PTL in clinical trials. Routine P/V examination at each antenatal visit to assess the cervical changes is less sensitive may not be liked by all patients & it itself may increase the risk of PTL. Two predictive measures currently of value are Trans vaginal sonography (TVS) & Biochemical markers. TVS to measure the cervical length & widening of canal are important. Length < 2.5 cm & funnelling of cervix (Y,V,U shape) suggest increased risk of preterm labour.[1] With cervical length < 1.5 cm PTL is almost certain. The presence of fetal fibronectin (FFN – a polypeptide) > 50ng/ml in cervicovaginal secretions is a specific predictor of preterm labour. Its negative predictive value is > 99 %.[2] Many new biochemical markers are under research. pIGFBP1 (phosphorylated insulin like growth factor binding protein 1) detection in cervical secretions predicts preterm labour. Bedside Test kit is available as 'Actim partus'. Positiver esulti .e.2 l ineso nt ests tripp redicts preterm labour. As compared to FFN it is less costly and it has less false positive results.

Prevention :

As spontaneous PTL is multifactorial & heterogenous condition, it is unlikely that a single intervention can prevent it. Identification & correction of risk factors (medical, obstetrical & lifestyle) whenever possible should be done. Treatment of vaginal & cervical infections & asymptomatic bacteriuria should be adequately done. Coitus late in pregnancy should be avoided. Prophylactic tocolysis although commonly practiced is not supported by evidence based medicine. Cervical encirclage is

only useful in proved case of cervical incompetence.[3] Emergency circlage (after membrane exposure) has limited evidence to support it, still it is an acceptable intervention due to poor prognosis of the condition. To avoid iatrogenic prematurity proper assessment of gestational age before induction is must. Progesteron although a weak tocolytic is found useful in recent prospective trials for prevention. It is given as 250 mg 17 alpha hydroxyprog. caproate I/M weekly or vaginally 100mg natural progesterone daily.[4]

Management :

Management of actual PTL case includes hospitalization, bedrest, sedation to relieve anxiety & improving hydration. Basic investigations with cervical swab for culture, electrolytes (for tocolytic therapy) and sonography for gest. age are carried out . The maind rugt herapyi nclude t ocolytics,s teroids & antibiotics .

Tocolytics : Tocolysis is contraindicated when continuation of pregnancy is either harmful to mother or fetus or is of no use. No ideal tocolytic exists. Short term tocolysis is of proven value. It gives time for steroids to work & shifting to the place with better NICU facility. Long term tocolysis is not supported by evidence based medicine still it is widely practiced as it gives some symptomatic relief & psychological support. Betamimetics are commonly used. Ritodrine is selective beta 2 receptors agonist. It is given by I/V drip starting at 50 mcg / min & increasing upto maximum 350 mcg/ min or till contractions cease or side effects appear (pulse/ 120/min or hypotension) I/V therapy is continued for 12-24 hours after contractions stop then oral therapy is started. Ritodrine is withdrawn from US market by manufacturer due to reports of pulmonary edema with I/V use. Isoxsuprine being cheap & old drug is maximally used in India inspite of very little evidence to support its use. It is nonselective & weak betamimetic. It is given 0.2 to 0.8 mg/min I/V in drip form . Terbutaline is given I/V 5 to 30 mcg/min or subcutaneous 0.25 mg hourly till tocolysis occurs. Nifedepine is a Ca channel blocker given orally 30 mg followed by 20 mg tid. It hasl essm aternals idee ffectsa ndn oa dverse fetal effects , thus better than betamimetics.5 Magnesium sulphate is given as 4 gm I/V loading dose in 100 ml over 20 min followed 2 gm/hour . It is mainly useful in PIH and DM whereb etamimeticsa rec ontraindicated.I th as maternal and fetal risks. Indomethacin a PG synthetase inhibitor is indicated in polyhydramnios with PTL . It is given 50-100 mg orally followed by 50 mg qid. It causes considerable neonatal morbidity. Nitroglycerine patch 10-20 mg applied over abdominal skin is found useful. It causes less sideeffects. Atosiban an oxytocin receptor antagonist (300 mcg/min I/V) is not available in India. Combination of tocolytics is not recommended as it only increases the side effects.

Steroids : It induces lung maturity and prevents RDS in preterm newborn. It also decreases intraventricular hemorrhage and necrotizing enterocolitis . Betamethasone is given as 12 mg I/M twice 12 hours apart. Effects occur after 24 hours. Weekly repeated courses are not indicated as IUGR & fetal brain damage is shown by recent studies.[6] Antibiotics are useful in treating subclinical infection & helps in prolonging pregnancy.Broad spectrum antibiotics i.e. ampicillin or cephalosporins are commonly given . For bacterial vaginosis metrogyl should be added. Antibiotics are must for PROM cases.

Management of advanced preterm labour:

In first stage of labour rest in bed is given to preserve the membranes. Strong sedatives are avoided and minimum P/V examinations are done. Electronic fetal monitoring is advisable . Epidural analgesia is the best. In second stage of labour instrumental delivery is avoided as far as possible. Liberal episiotomy is must.

Immediate clamping of the cord is done at delivery. Neonatalogist must be present. There is some delay in separation and delivery of placenta in preterm labour. Elective LSCS for preterm fetus is not indicated. LSCS is only indicated for very preterm fetus, associated IUGR and for other obstetric indications. LSCS in a poorly formed lower segment can be equally traumatic for the baby. Infact vaginal delivery may be of some benefitb ye xpellingf luidf romt hec hestd uring delivery & facilitating lung expansion.

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INDUCTION & AUGMENTATION OF LABOUR

Dr. H. P. Pattanaik

Induction of Labour is the procedure to initiate labour artificially to terminate pregnancy after 28 weeksp referablya fter3 7w eekso fp regnancy aiming to secure normal vaginal delivery.

Augmentation of labour is the procedure to enhance pre established labour for early vaginal delivery.

The **indications** may be divided into three broad categories of Maternal, Foetal & Combined. **Maternal Indications** are the condition where continuation of the pregnancy may affect the maternal health. They are intra uterine foetal demise, malformation of foetus & polyhydramnios. **Foetal indications** are the conditions which may affect the foetal health by continuation of pregnancy. They are prolonges pregnancy (either postdated or post mature pregnancy), IUGR, Rh iso immunization, Unexpected IUFD in previous pregnancy and Diabetes mellitus. **Combined indications** are the conditions which may adversely affect maternal & foetal conditions. They are PIH at term, Eclampsia, Essential Hypertension, Chronic Renal Disease in pregnancy, Bad obstetric hisotry, APH either Accidental Hemorrhage or incomplete Placenta praevia.

Contraindications of induction will include major degree cephalo pelvic disproportion, major degree of placental previa, pregnancy following classical caesarean section, pregnancy following VVF or Fothergill's reapair, Carcinoma cervix, Active genital herpes, Foetal malpressentation like transverse lie and Pelvic tumors.

ASSESSMENT FOR INDUCTION

Before going for the induction complete assessment of mother & fetus, the confirmation of gestation age, assessment for cephalo-pelvic disproportion, exclusion of foetal mal presentation & pelvic tumours should be done. Cervical status should be checked with Bishop's score whether favourable / unfavourable and finally station of the presenting part to be ascertained.

METHODS OF INDUCTION

Method of induction can be either Medical or surgical. Medical inductions include Oxytocin and Prostaglandin. Surgical induction is done by artificial rupture of membrane.

Oxytocin[1] is an octapeptide containing pentapeptide ring and a tripeptide side chain. Synthetic oxytocin are Sytocinon 2 IU/Ml amp and Pitocin 5 IU/Ml amp.. Oxytocin acts on cell membranes of uterine muscle and facilitates permeability of calcium increasing its sensitivity, and thus causing rhythmical contraction & relaxation of the uterus. It is administered as Intravenous Infusion with or without aminotomy. 5 units of oxytocin is added to 500 ml of Ringer lactate to administer a dose of 0.5 mu/drop. Oxytocin should be started with 5 mu/min (10dr/min) increasing it at 15 – 30 min interval to a maximum 30 mu/min (60 dr/min). Double the dose of oxytocin may be started in the next infusion at 10mu/min. In 2005, J. H. Patka reported that high-dose oxytocin decreases the time from admission to vaginal delivery, but does not appear to decrease the incidence of cesarean sections when compared with low-dose therapy [2].

ADVANTAGE OF INFUSION

Accurate tritration of the dose as well as increase or decrease in the dose to uterine response can be done easily due to short half-life and the option for prompt cessation if desired [3].

The patient should be under constant supervision during induction by monitoring uterine contraction, foetal heart rate and progress of labour preferably with partograph. Oxytocin infusion can cause incoordinate uterine action, uterine hyperstimulation, foetal hypoxia & distress and rupture of uterus in multi gravidae.

Prostaglandins are a group of modified long chain of hystroxy fatty acids. The three main prostaglandins in use are PgE_1, PgE_2 & $PgF_{2\alpha}$, They havep otento xytocice ffecto np regnantu terus irrespective of duration of pregnancy but have a short duration of action. They are rapidly metabolized in body by oxidation of 15-hydroxy group to ketone by enzyme 15 hydroxyl prostaglandin dehydrogenase (PGDH).

They can be administered orally, vaginally, extramniotic,i ntraa mniotica ndi ntramuscularly. Oral Prostaglandins are given as PGE_2 tablets containing 0.5 mg of PGE_2 and is given at 30 min - 1 hr interval. The dose can be doubled & maximum 30 mg may be used. It is more effective in multigravida when combined with amniotomy. But failure rate is higher in primigravidae with unfavorable cervix. Vaginal Prostaglandins are available as Gel or Tab containing 0.5 to 2 mg PGE_2. They are used for ripening the cervix. Given 24 hrs prior to induction either in endocervical canal or posterior fornix. Misoprostoli sa vailablea s2 5mgt ab.W hichi s given 4 – 6 hourly intravaginally. In 1996, Mundle WR concluded that vaginal misoprostol is a cost-effective alternative to other labor-induction protocols and found no evidence of harm to mother or newborn in substantive outcomes [4]. In 2003, **Lokugamage AU** et al in their series of 192 patients reported that intravaginal misoprostol led to a shorter, more efficient labor compared to Dinoprostone and although there was more anxiety related to the CTG, there was no increase in neonatal adverse effects [5]. Contraindications of prostaglandin includes bronchital asthma, epilepsy, hypersensitivity of drug, renal disease and hypertension.

Surgical Method – Amniotomy is an artificial rupture of membrane done for induction of labor. Success rate is high with ripe cervix and is more effective when combined with oxytocin infusion. It has added advantage of visualizing amniotic fluid which indicates fetal condition. A meta-analysis of amniotomy and oxytocin has shown that those who receive oxytocin from the time of amniotomy were more likely to be delivered within 12 hours and within 24 hours than those who had amniotomy alone, and were less likely to have operative delivery. [6]

Risk of induction include failure if labour continues beyond 24hrs. There is a chance of prematurity in case of mistaken dates. Abnormal uterine action in form of uterine hypertonicity, incordinate uterine action may sometimes lead to rupture of uterus particularly in multi gravidaes. Other risks include chorioa mnioiti,f oetalh ypoxia o rd istressa nd amoniotic fluid embolism in few cases.

PLACE OF CAESAREAN SECTION

Caesarean section is performed in prolonged or failed induction, foetal distress, incordinate uterine action, malposition particularly like occiputo posterior. The incidence of caesarean section is higher following induction than in spontaneous labour and varies from 15 to 30% in hospital practice.

Conclusion :

Induction & acceleration of labour are of paramount importance in achieving a safe vaginal delivery. Proper assessment of maternal pelvis, liquor, cervical condition as well as foetal status determines the success of induction. Risk &

contraindications of induction are to be kept in mind in deciding continuation of the procedure. Oxytocin and prostaglandin are the drugs of choice of medical method. Prostaglandins have a high success rate in inducing labour. Early decision for Caesarean section in case of failed or prolonged induction is necessary for optimum maternal & foetal outcome.

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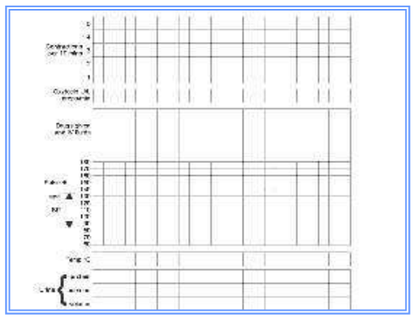
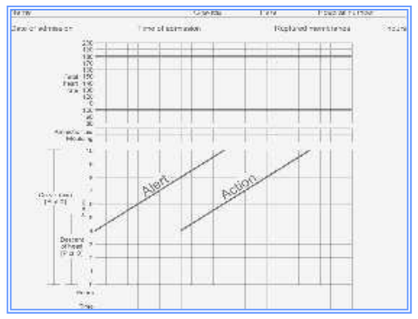
PARTOGRAPH

Dr. Sheela Mane
Chairperson
Safe Motherhood Committee

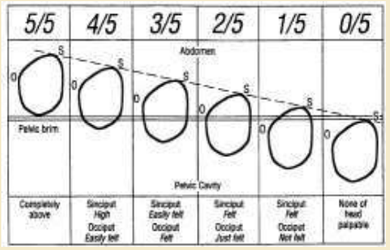
Partograph is graphical record of progress of labour. It is a scientific method of keeping the record of progress of labour in graphical form which can differentiate normal progress before it is too late. It should ideally be used for every labour.It was originally started by Friedman.
Uses To detect labour that is not progressing normally To indicate when augmentation of labour is appropriate To recognize CPD long before obstruction occurs The Partograph increases the quality of all observations on the mother and fetus in labour, serves as an “Early warning system” and assists in early decision on transfer, augmentation, termination of labour.

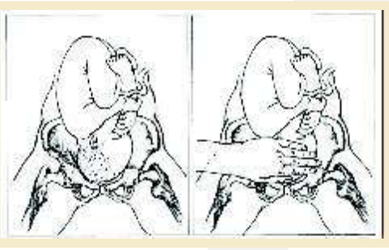
Who should not have a Partograph
Women with problems which are identified before labour starts.
The Observations charted on the Partograph are The Progress of labour
Cervical dilatation Descent of fetal head Uterine contractions–duration, frequencyFetal condition Fetal heart rate Membranes and liquorMoulding of the fetal skull Maternal condition Pulse/ BP / Temp Urine – volume, acetone, proteinDrugs and IV fluids, Oxytocin regime.

Starting a Partograph (WHO) A partograph should be started only when a woman is in active phase of labour.Contractions must be 1 or more in 10mins, each lasting for 20secs or more.Cervical dilatation must be 4cms or moreIn the centre of Partograph is a Graph. Along the left side are numbers 0 -10 against squares. Each square represents 1cm dilatation.
Along the bottom of the graph are numbers 0-24. Each square represents 1hourThe dilatation of Cx is plotted with an 'X'. Vaginal examinations are

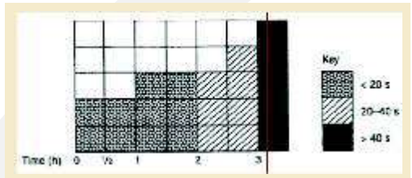
done at admission and once in 4 hours
Descent of fetal head is measured in terms of fifths above the pelvic brim



The width of the 5 fingers is a guide to the expression in fifths of the head above the brim. A head that is mobile above the brim will accommodate the full width of 5 fingers



As the head descends, the portion of the head remaining above the brim will be represented by fewer fingers.It is generally accepted that the head is engaged when the portion of the head above the brim is represented by 2 fingers are less
Plotting the descent of the head. On the left hand side of the graph is the word “descent' with lines going from 5 – 0.Descent is plotted with an “O' on the Partograph
Uterine contractions. Observations are every half hour in active phase Frequency -Number of contractions in a 10 minutes period Duration – Measured in seconds from the time the contraction sets in to the time the contraction passes off
Recording uterine contractions
On the Partograph below the time line, there are 5 blank squares going across the length of the graph. Each square represents 1 contraction



Plotting contractions on the Partograph

Fetal Heart Rate. Listen-Patient in left lateral position Just after the contraction has passed its strongest phase. For 1 full minute, if abnormal every 15mins abnormal over 3 observations, take action and
Record. At the top of the Partograph, Every half hour

Membranes & Liquor

State of Liquor	Record
Membranes intact	I
Clear	C
Meconium	M
Absent	A
Blood Stained	B

Fetal condition

State of Moulding	Record
Bones are separated & sutures felt	O
Bones are just touching each other	1+
Bones are overlapping	2+
Bones are overlapping severely	3+

Points to remember When the woman comes in the active phase of labour, recording of cervical dilatation starts on the alert line according to WHO Cervicald ilatations houldb e< /=1 c ms,w hen progress of labour is normal, plotting of cervical dilatation remains on the alert line or to the left of it
Action line is 4 hours to the right of alert line.
At the Action line. Assess the cause of slow progress and take action.
Action should be taken in a place with facility for dealing with obstetric emergencies is available.
Remember Moving to the right of the alert line.

WARNING
Transfer woman from health centre to hospital Reaching the action line means

POSSIBLE DANGER
Decision needed on further management
(usually by obstetrician or medical officer)

CONCLUSION-
Iti sa dvisablet ou seP artographa ta lll evelso f care.

PERIPHERAL HEALTH WORKERS
To prevent obstructed labour.To prevent rupture uterus.For early transfers to higher centers IN HOSPITALS to monitor all labours. To detect deviation from normal progress.To decide on intervention

REFERENCE-
MATERNAL HEALTH AND SAFE MOTHERHOOD PROGRAMME. DIVISION OF FAMILY HEALTH..WHO..GENEVA.

DIFFICULY IN DELIVERING BABIES DURING CAESAREAN SECTION

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Caesarean section (CS) is a commonly performed procedure firmly ensconced in obstetric practice. Public perception of Caesarean sections has seen a swing from a "failure of obstetric care" to being "safe for mother and child." However there have been occasions where an obstetrician has been manhandled for a poor outcome and blamed needlessly for not having performed a CS. The primary goal of an obstetrician is first to do no harm.

A collaborative study done by the Indian Council of Medical Research (ICMR) in the 1980s showed a Caesarean section rate of 13.8 per cent in teaching hospitals (1). This has risen significantly. The overall rate showed an increase from 21.8 per cent in 1993-94 to 25.4 per cent in 1998-99. Amongst that 42.4 per cent were primigravidas and 31 per cent had come from rural areas. Because of the rise in primary Caesarean sections, there is a proportionate rise in repeat sections as well.

One of the major advantage of CS delivery is the fact where there is an indication like fetal distress or forces of labour are not optimal or where the birth passage is compromised , the fetal journey through the birth canal is eliminated and a controlled baby delivery under direct vision is accomplished.

Paradoxically, these are the situations in which the delivery of the baby may not be as easy as it seems and a difficult or traumatic abdominal delivery would defeat the very purpose for which the caesarean was being performed.

The key to avoid this problem & obstetrician's palpitations is anticipation and planning. One must know when to expect trouble, plan anaesthesia, abdominal entry, uterine incision & method of baby delivery, keeping all the factors in mind. Adequate knowledge of fetal lie, presentation, station, degree of flexion & position of occiput helps to plan the method of baby delivery.To reduce adverse neonatal outcomes induction – delivery interval of more than 8 minutes and incision - delivery interval of more than 3 minutes should be avoided. (Datta & Weiss, Obs Gyn, 1981).

Why are some Caesarean sections difficult ?

There are also challenges due to access depending on the incision taken. Though transverse incision is commonly used, sometimes it can limit the space available specially where the previous surgical scar is inadequately excised . Adequated issectiono fb ladderp eritoneumf or

protection of bladder and knowledge of uterine incision with relation to the presenting part is essential. Use of transverse curvilinear incision or J shaped incision in case of a poorly formed lower segment to maximize the available space is beneficial. Sometimes an inverted T incision has to be taken in cases of an impacted transverse lie (documentation & counselling the patient and relatives about the need for an elective CS in future is a must). A vertical (De Lee's) incision can be taken in the LUS for a premature breech though not generally used due to danger of extension into upper segment.

Cranio-pelvic relationships determine the ease of baby delivery.T herec anb ed ifficulty encountered during cases of floating head, deeply engaged head, abnormal positions & presentations like transverse lie or breech presentation, deflexed head, prematurity, multiple pregnancies, fetal malformations, conjoined twins etc.

Challenges due to a poorly formed lower uterine segment (LUS) are seen in case of prematurity, fibroids or adhesions in lower segment or a low lying placenta. In case of an anterior placenta previa one must anticipate a poorly formed & vascular LUS. After incision, membranes can be accessed by insinuating fingers between placenta & uterine wall & then rupturing them to access the fetal parts. Sometimes placenta has to be incised for rapid transplacental access & delivery but caution must be exercised while doing this.

Delivery of a floating head:

After confirming the findings, baby is manipulated into longitudinal lie and steadied by lateral support. Uterus is incised by taking a transverse curvilinear incision at a slightly higher level (but still in the LUS). Membranes are ruptured , liquor drained, allowing the head to descend into the incision site & delivered by maintaining flexion. Other options are - instrumental delivery by forceps, vectis, or vacuum after manipulation into occipito anterior or posterior position. During caesarean section: one (used as a lever) or the two blades (of short forceps) may be used to extract the head through the uterine incision. Applications for forceps during CS is desirable to reduce undue trauma to fetus. During forceps application flexing the fetal head with traction ,slight fundal pressure helps to push the the head towards the incision ,sagittal suture is placed transversely with concavity of the pelvic curve towards the fetal occiput. Lower blade is applied first followed by the anterior and delivered by controlled extension. Long axis of blades should be along mento-vertical diameter of head (biparetal and bimalar). Hay's forceps also can be used for CS. This is an obstetric forceps specially designed to have the versatility of a short and long forceps with a capability of actively promoting flexion of the fetal head and carrying out safe rotations (so the name) (2)Hence routine use of instrumentation is safe & effective.(3.)

Complications –
Maternal & fetal tissue trauma, extensions of uterine incision, haemorrhage.

Use of vacuum for the baby delivery at CS:
Various vacuum cups are available for use at CS. The cup is applied directly to fetal scalp as near to the posterior fontanelle and over the saggital suture with the knob in the direction of the occiput ensuring that no maternal tissue is interposed between cup & head. With a partial vaccum (100 mm Hg. Or 0.2 kg / cm2 or 20kPa) sufficient to fix the cup to the fetal head (negative pressure should not exceed 600 mm Hg or 0.8kg/cm2 or 80kPa).Suction pressure is built as rapidly as possible (1-2 min according to Martius and Friedamn). In the newer silastic cups there is no need to wait for the build up of the pressure. Traction is in a direction always perpendicular to the plane of cup & calvarium. (4)

Complications - Maternal & fetal tissue trauma,

cephalhaematoma etc.

Deeply engaged Head:

One should anticipate this problem in cases of a woman with an anthropoid pelvis ,a big baby with a deep tranverse arrest. Trendelenberg position & uterine relaxant anesthesia is beneficial.Bladder should be adequately mobilized. The uterine incision is pre planned at a slightly higher level in the LUS. Options are vaginal disengagement of the head by manual disimpaction or vaginal manipulation by an assistant ,or an Ellis disimpactor (still under research) **The baby can be delivered by inserting a hand inside the uterus towards the fundus ,reaching for the feet and then doing a breech extraction only if there is adequate liquor and enough space**

When fetal shoulders are seen the baby can also be delivered by **Patwardhan's maneuver** if fetal back is posterior. One arm is delivered followed by same side leg . then delivery of other leg & the opposite arm & finally the head. In cases where fetal back is anterior, first the upper limbs and shoulders are delivered followed by fetal trunk and the the lower limbs. The baby's body is turned caudally, and the head is scooped out of the pelvis (**Modification of Patwardhan's maneuver**).

Breech delivery:

Incision on LUS must be adequate. Fetal limbs are manipulated through natural range of movements, trunk supported by pelvic girdle to encourage suitable rotation .The premature breech is more prone to injury as the lower segment is thick walled, narrow & retractile over a relatively larger aftercoming head. Head delivered by **Burn Marshall** or **Mauriceau Smellie Veit maneuver** or **with** forceps .

Transverse lie:

A transverse lie delivery should be preferably done by an skilled and experienced surgeon or atleast anticipate the problems and ask for an experienced assistant prior to starting the CS.

External cephalic version (ECV) is an option if membranes are intact to the convert the lie to a longitudinal one .Other option is to use a liberal transverse curvilinear incision in LUS .The operator inserts his hand along the baby's back towards the baby's buttocks, knees and the foot of the baby is held. **In a dorso posterior position** the hand of the baby may repeatedly come in the incision site so reposition of the the hand back into the uterus, feeling the baby from the anterior aspect and reaching for the foot will help.

Sepsis to watched out for, when membranes have ruptured for long , there is hand or cord prolapse. Higher antibiotics are needed !!!

Multiple Pregnancies :

It is very crucial to have the information about the number of fetuses, their lie, presentation and placentation prior to CS .Care is taken to deliver first baby whatever be the presentation. Aggressive prophylaxis for postpartum hemorrhage is essential.

Possible causes of injury to newborn :

Deep or uncontrolled uterine incision, inappropriate or inadequate uterine incision or haste or difficulty in fetal extraction are the major contributing factors. Major injuries like head laceration, skull,neck, shoulder fracture, dislocation of nasal cartilage,brachial plexus or spinal cord injury, liver hematoma can occur.To prevent these, avoid hasty and difficult baby delivery. Also the obstetrician should be well versed with different maneuvers for baby delivery during a CS. **Guidelines to be followed** :

1.) Planning the uterine incision suitably, 2) Use of sharp dissection for adhesions due to previous CS, 3.) Avoiding wide lateral dissection of the bladder, 4.) Careful delivery of the fetal head , **5.) Presence of skilled neonatal support for resuscitation of the newborn**, 6.) Preferring spontaneous expulsion of placenta reduces blood loss by 300ml, 7.) Prophylactic use of oxytocic drugs, 8) Clamping the cut edges of the incision with hemostatic forceps & rapid closure of the uterine incision is a must.

Conclusion and recommendations -

With a multitude of health care delivery systems in India, implementing universal protocols becomes an onerous task.

Non vi sed arte.... (i.e. Not by force, but by skill...) - Hippocrates

FOGSI has taken an initiative and carried out 35 workshops on " FOGSI Caesarean Skills Updates" all overl ndia.L earninga nda doptingt hes killsf or difficult LSCS is important in order to reduce the maternal and fetal complications in order to have a healthy mother and a healthy baby.

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POST PARTRUM HAEMORRHAGE (PPH)

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INTRODUCTION

Postpartum hemorrhage (PPH) is a serious life threatening obstetric problem. It is defined as the loss of blood more than 500 ml following vaginal delivery and more than 1000 ml following caesarean section or amount of blood loss which alters the vital parameters and general condition of the patient. The incidence of PPH is reported to be 3.9% following vaginal deliveries, 6.4% following caesarean section and higher with high risk pregnancies with overall incidence of 10% 1. In 2005, the World Health Organization reported that of the 529,000 maternal deaths occurring every year, 136,000 i.e. 25.7% occur in India and 29.6% of them die due to PPH 2. Apart from maternal mortality, 10.3% of women with PPH end up with obstetric hysterectomies 3 and 12% of women with severe anaemia 4.

Risk Factors : Seventy percent of PPH occur due to uterine atony 5. The risk factors responsible for atonic PPH are advanced maternal age, high parity, overdistension of uterus, PIH, antepartum haemorrhage, precipitate labor, induced labor, prolonged labor, drugs, operative delivery, obstructed labor, infection, mismanagement of third stage of labor, retained placenta, inversion of the uterus, previous history of PPH and others. Most common risk factors for traumatic PPH are previous caesarean section, other scar on the uterus,o bstructedl abor, m isuseo fu terotonic drugs and operative vaginal delivery.

Prevention of PPH : In majority of PPH cases risk factors are not identified hence, it is essential to take preventive measures against PPH in all women at delivery. When risk factors are present, preventive measures are instituted which include correction of anemia before onset of labor, placing large caliber needle during labor, arranging typed – cross match blood and active management of third stage of labor.

Active management of third stage of Labor includes 1) Administration of oxytocin intravenously or Methylergometrine 0.2mg intravenous at the delivery of anterior shoulder 2) Immediate camping and cutting the cord. 3) Control cord traction 4) Gentle uterine message after delivery of placenta.

Oxytocin drip (20IU in 500 ml. of normal saline) administred before placental separation to expedite the process and after placental expulsion to enhance the contraction of the uterus has reported to cause a significant reduction in mean blood loss and PPH as compared to placebo 6. Two cochrane reviews reported that neither intramuscular prostaglandins nor misoprostol oral or rectal when administered prophylactically had advantages compared to conventional uterotonic drugs 7.

Pharmacological Management of Atonic PPH :

Drug	Dose	Route	Frequency of Dose	Contraindications
Oxytocin	10 - 40 units	IVinfusion/IM/ IMM/Umbilical cord vein	Continuous infusion	No contraindications
Methylergometrine	0.2 mg	IM/IV/IMM	Every 2-4hrs	Hypertension/PIH
15 – methyl PGF2 alpha	0.25 mg	IM /IMM	Every 15-90 minutes, not to exceed 8 doses	cardiac, pulmonary, renal or hepatic disease
Dinoprostone PGE2	20 mg	PR	Every 2 hours	Hypotension
Misoprostol	400-800 g	Oral/PR/PV	Every 2 hrs	FDA Approval

General Principles of Management of PPH includes venus access, oxytocin drip and other oxytocics, catheterization, oxygen by mask, arrangement of blood, intravenous antibiotics and type of PPH by abdominal palpation of uterus. Atonicity of uterus indicates atonic PPH and persistent bleeding despite of well contracted uterus indicates traumatic PPH which requires immediate exploration.

Management of Atonic PPH : After starting oxytocin infusion and catheterization, control cord traction is attempted to deliver placenta and if unsuccessful, manual removal of placenta is done under general anesthesia. Placenta should be always examined and if incomplete requires immediate exploration.

Surgical Management of Atonic PPH : When medical management fails, surgical intervention should be considered. Since last decade, conservative surgical procedures have been successfully used in various circumstances and forms. Conservative surgical approach not only controls PPH but also preserves the women's reproductive functions and avoids hysterectomy and its related complications and consequences.

1) B-Lynch uterine compression suture (Brace suture) and other modified techniques control atonic PPH by providing an effective compression of the placental bed. This method is simple, effective, relatively safe and life saving procedure which requires minimal expertise.

2) Step wise devascularization of the uterus includes a) unilateral uterine artery ligation b) bilateral uterine artery ligation at the upper part oft hel oweru terines egmentc)l owu terine vessels ligation after mobilization of the bladder d) Unilateral ovarian vessel ligation e) Bilateral ovarian vessels ligation. In 1995, Oleary J.A. in his study of 265 patients who underwent uterine artery ligation over the period of 30 years reported only 10 failures 8.

3) Internal Iliac Artery ligation : Experiment in the 1960, by Burchell ascertained that the effect of ligation of the internal iliac was to convert the effected pelvic circulation to a venous system, thereby allowing clotting to develop and persist. Only 42% of ligation are successful because of the abundant collateral blood supply of the uterus from the contralateral iliac vessels. Disadvantage of this procedure is requirement of expertise.

4) Selective Arterial Embolization requires trained interventional radiologist with set up.The catheterization is carried out through the femoral artery to the internal iliac to the uterine and ovarian arteries. Both the sides are

occluded by gelatin particles or pieces of gel which cause temporary blockade. The gelatin gradually dissolves within 10 days and the vessels are recanalized. The success rate reported to be more than 75% and does not affect future fertility. Major complications associated with the procedure are hematoma, infection and tissue ischemia.

Obstetric hysterectomy is the last option when all medicala nds urgicali nterventionf ailt oc ontrol PPH.

Management of traumatic PPH : Persistent of bleeding inspite of well contracted uterus indicates Traumatic PPH. Exploration under anesthesia to diagnose site of the injury and treatment is a must. In case of lower genital tract injury, after catheterization vulval and vaginal tears are sutured with mattress suture 1/0 or 2/0 catgut or vicryl. Clitorial and paraurethral tears are suture with 3/0 catgut. Vaginal hematoma should be evacuated with layer closure. Cervix should be sutured with 2/0 catgut or vicryl and vaginal packing usually controls the bleeding from the cervical laceration.

In case of upper genital tract injury, laparotomy is necessary. If bleeding persist after suturing rupture uterus, one must proceed with obstetric hysterectomy. Internal iliac artery ligation is indicated in broad ligament hematoma, lower segment tear. Total hysterectomy may be required in controlling bleeding from lower segment, cervical and fornicial tears

Secondary PPH : Uterine infection, retained placental fragments and subinvolution of the uterus are responsible for the secondary PPH. Antibiotics and uterotonic should be used to control PPH. If bleeding is uncontrolled, selective arterial embolization is carried out after ruling out gestational trophoblastic tumor.

Conclusion :
Postpartum hemorrhage can be anticipated, prevented and all can be treated. Increased obstetric care decreases PPH related complications and consequences. FOGSI's project in Emergency Obstetric Care (EmOC) and training of birth attendants in rural areas of India will definitely reduce the incidence, maternal morbidity and mortality due to PPH in future.

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OBSTETRIC SEPSIS

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The term sepsis refers to the presence of pyogenic or other pathogenic organisms and their toxins in tissues or in the blood.

SIRS, SEPSIS, SEVERE SEPSIS AND SEPTIC SHOCK: A SPECTRUM [1,2]

SIRS (SYSTEMIC INFLAMMATORY RESPONSE SYNDROME) is a clinical response arising from a nonspecific insult, including ≥2 of the following:

- Temperature ≥38°C or 36°C
- HR ≥90 beats/min
- Respirations ≥20/min, PaCO2< 32 mm Hg
- WBC count ≥12,000/mm^3 or ≤4,000/mm^3 or >10% immature neutrophils (Band Forms)

There is no specific treatment other than organ support and treatment of infection.

SEPSIS is defined as **SIRS with a presumed or confirmed Infectious process which means there should be** all the clinical features of SIRS Plus bacteraemia (that is, positive blood cultures) or positive swab culture.

SEVERE SEPSIS is the term used when there is Sepsis with ≥1 sign of organ failure or organ dysfunction-for example, acute renal failure. Other organs may also be affected, e.g. Cardiovascular, Respiratory,Hepatic, Hematologic (leading to DIC), or CNS organs. Metabolic acidosis from hypoperfusion is an important association.

SEPTIC SHOCK

When there is Severe sepsis with persistent refractory hypo-tension, the term Septic shock is used.T hec linicald efinitiono fs hock includes foremost hypotension typically, a systolic blood pressure (BP) of <90 mmHg or a >40 mmHg fall in baseline systolic BP] and can be accompanied by laboratory evidence of multiple organ injury. If inadequately treated, the patient will progress relentlessly, and ultimately irreversibly, to multiple-organ-system failure and death.

Causes of sepsis in obstetric patients include:

- Septic abortion
- PROM / PPROM
- Chorioamnionitis
- Postpartum endometritis
- Wound sepsis
- Respiratory infection / Pneumonia
- Pyelonephritis / Urinary Tract Infection
- Necrotising fasciitis
- Acute appendicitis/ pancreatitis/ cholecystitis

Common organisms implicated are E. Coli, Klebsiella, Group A and Group B Streptococcus , Staphylococcus, Bacteroids ,N. Gonorrhoea, C. Trachomatis, Cl. Welchii, Mycoplasma hominis and H. influenzae.

Inflammatory mediators are very important in the pathogenesis of sepsis and a whole bunch of mediators are active at the tissue level, e.g. TNF - α, Interleukin 1β and 6, Arachidonic acid metabolites (Leukotrienes, PG, Tx).

The complement system, the coagulation cascade including the Fibrinolytic system are involved both in the early as well as late stages of septic shock. Other mediators are Prekallikrein and Kallikrein, Bradykinin, Histamine, β- endorphine / Encephalin and the Myocardial depressant factors. These inflammatory mediators cause Endothelial dysfunction, Increased vascular permeability, myocardial suppression and finally Activation of coagulation cascade leading to DIC. This happens in two stages as follows:

In early stage of sepsis released Vasoactive Mediators cause Vasodilation, Platelet aggregation, Capillary plugging, Endothelial damage resulting in Cellular hypoxia , lactic acidosis and worsening of tissue perfusion

In late stage of sepsis poor tissue perfusion causes decreased vascular resistance, decreased Cardiac output, vasoconstriction, further decrease in tissue perfusion and end organ damage. Many cytokines cause global myocardial dysfunction, which results in septic shock.

Investigations recommended are CBC, ESR, Blood grouping and Rh typing. Urine examination for Routine, Microscopic culture and sensitivity is important to exclude the urinary cause. Blood culture should preferably be done at the beginning of treatment and Blood Gas Analysis, Blood Glucose, electrolytes, BUN, creatinine along with Coagulation Profile and Liver function test should be done periodically.

Special investigations are Endocervical and high vaginal swab culture which must be taken prior to internal examination. The material is sent for Gram staining, Culture both in aerobic and anaerobic medium and Sensitivity test. Imaging tests like USG, Supine and upright x-ray of abdomen – Air, FB, CT, MRI are needed in special cases to see for myometrial necrosis.

MANAGEMENT [3]

The patient must be hospitalized and kept in isolation if possible.
Overall assessment of case along with clinical grading is done
Aimso ft reatmenta re(a)C ontrolo fs epsis,(b) Removal of source of infection, (c) Supportive therapy and (d) Assessment of response to treatment

General management consists of control of sepsis initially done by administering Broad-spectrum antimicirobial therapy. Multiple drugs are preferable as it is commonly a mixed infection. Prophylactic TIG along with Tetanus Toxoid is administered. Maintenance of haemodynamic status is of utmost importance.

Early Goal directed therapy (EGDT):

- Rapid crystalloid infusion. MAP should be maintained at 65 mm Hg and urine output should be 30 ml/hr
- Blood transfusion
- Insertion of CVC, PAC. CVP is ideally maintained at 8-12 mm Hg
- Administration of ionotropes like Dopamine, Norepinephrine or Dobutamine

Tissue oxygenation is maintained by supplementalo xygenationm aintaining o xygen saturation at > 70% Blood transfusion improves the tissue oxygenation especially if haematocrit < 30%. Mechanical ventilation is needed in ARDS Anti – inflammatory agents like Hydrocortisone or Dexamethasone must be used liberally.

Human recombinant activated Protein C (HRAPC) is an Anticoagulant / Anti-inflammatory agent which is administered at the dosage of 24 μg / kg / min for 4 days. It acts by stimulating fibrinolysis. And it decreases thrombin formation by Inhibiting platelet activation, Inhibiting neutrophil recruitment, and inhibiting mast cell degranulation[4]. Unfortunately, there is no study on

pregnant mothers and trials like ADDRESS trial or PROWESS trial have not shown any benefit. Also, there is increased chance of haemorrhage[5]. Contraindications are recent trauma or surgery, Active hemorrhage, Concurrent anti-coagulant use, thrombocytopenia or recent stroke

Supportive measures include GI haemorrhage prophylaxis by H2 receptor blockers, maintainance of nutrition preferably orally, although total parenteral nutrition may be required, DVT prophylaxis by Prophylactic heparin and skin care are given.

SPECIFIC MANAGEMENT: According to the obstetric condition encountered.

Important factors influencing outcome are Immune response of the host vis a vis virulence of the micro organism along with burden of infection and antibiotic resistance.

Scopes of surgery are many, e.g. drainage of abscess, dilatation & evacuation, exploration of uterus, laparotomy and /or hysterectomy, wound debridementa nds econdarys uture.I ti st ob e remembered that Chorioamnionitis and PROM are not indications of C-section as such, and Caesarean section should be done for obstetric indications only.

In conclusion, the essence of sepsis management includes Early goal directed therapy (EGDT), maintenance of Lung perfusion, antibiotics, Activated protein C (APRC) in select cases, judicious use of corticosteroid, vasopressin and Dobutamine, organ function support and prevention of nosocomial infection.

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